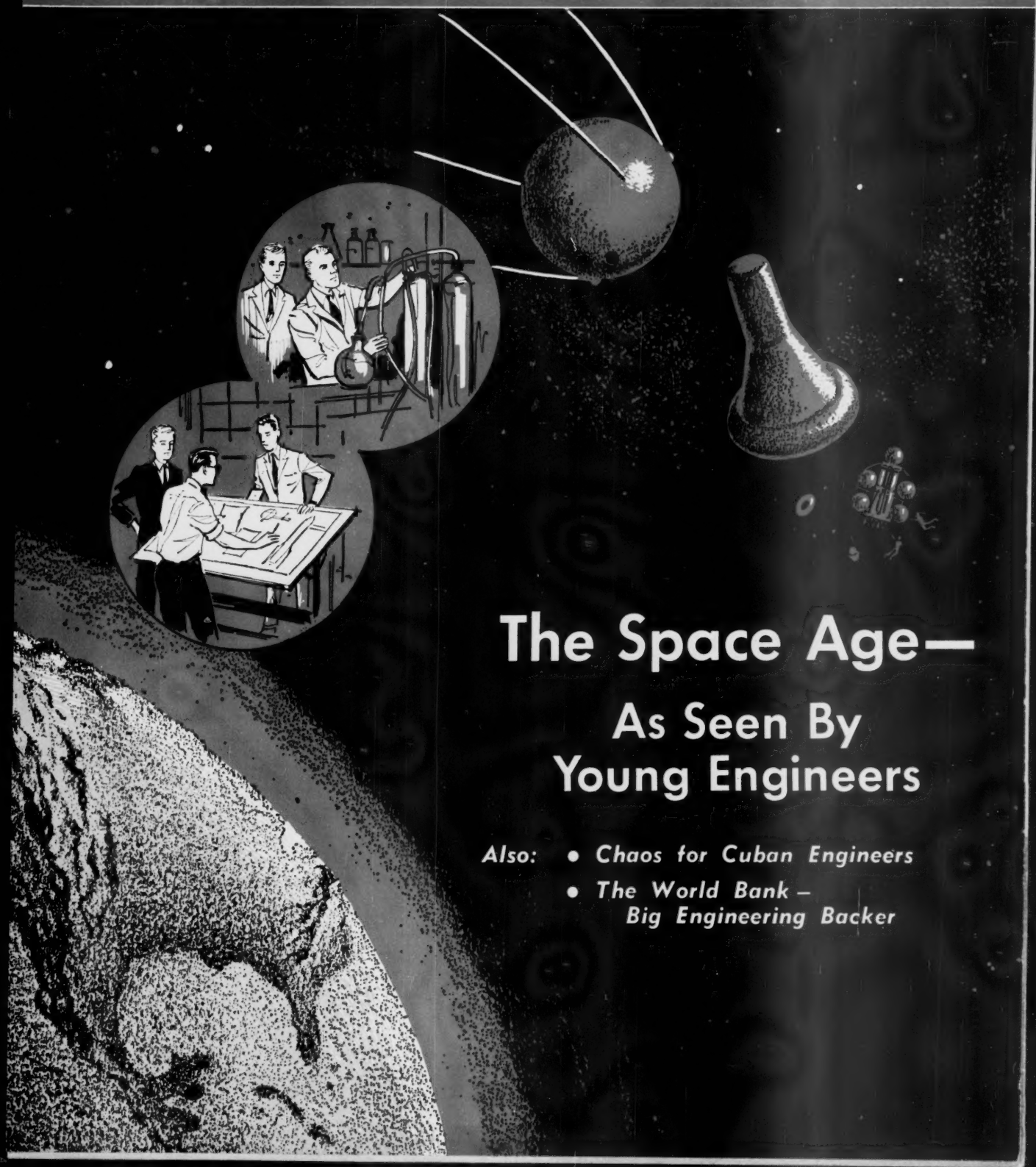
The Magazine of the Registered Professional Engineer

American Engineer

MAY 1961



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See Page 21
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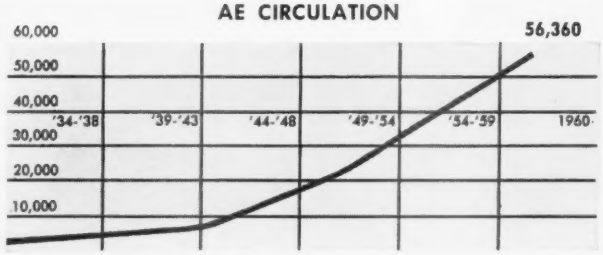

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Letters to the Editor

Firsts . . .

Dear Editor:

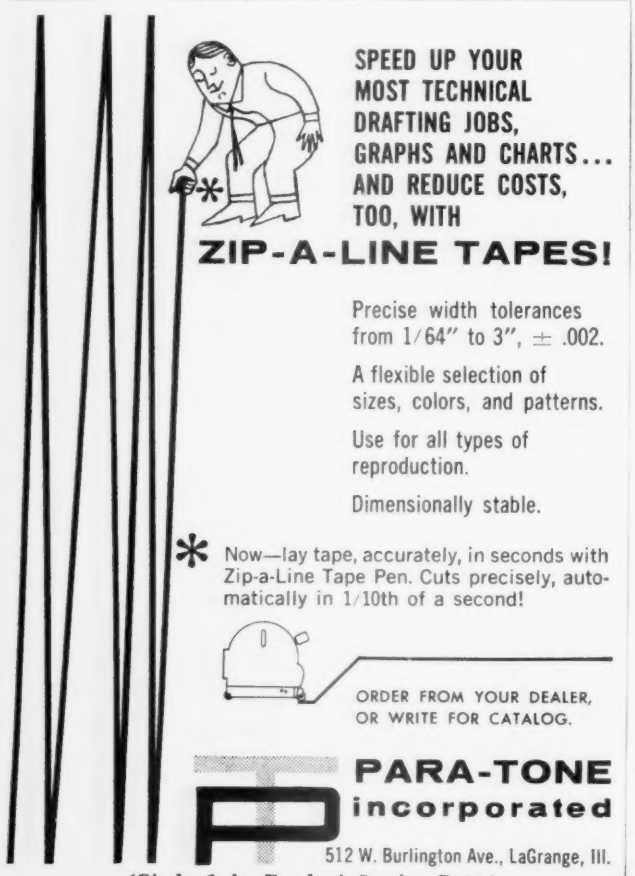
I am a member of the American Society of Civil Engineers and of the Missouri and National Societies of Professional Engineers so, of course, a Registered Professional Engineer. As such I receive the AMERICAN ENGINEER. . . .

On page 28 of the January number of the AMERICAN ENGINEER there is a table that purports to show certain information comparing the professions of medicine, dentistry, law and engineering. In this table, among other things, on line 6, is shown the dates of the "Founding of Professional Society" in the various professions. This indicates that, in engineering the first professional society was founded in 1934. I do not know when the other Founder Societies were founded, but it is a fact that the American Society of Civil Engineers was founded in 1852 and I certainly feel that it is a professional engineering society. I believe that when the term "civil" was first used in connection with engineering, it was to distinguish the men engaged in engineering work for civic or civil employers from those working as military engineers, who, up until that time had done all types of engineering work.

Later, as mechanical, electrical, chemical, heating and ventilating and other specialized branches assumed importance, they broke away from the civils and formed their own societies. The date of 1934 applies to the National Society of Professional Engineers, which, in my opinion, was not the first engineering society.

I feel that this impression should be corrected.

A. T. CUSHING, P.E.
Member, ASCE,
Kansas City, Mo.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► ***Editor's Note:*** **There is no doubt that a number of engineering societies were founded prior to NSPE, but the author of the article in question was attempting to make comparisons between over-all professional societies to which all qualified members of the profession are eligible for membership, and who are devoting their energies to professional matters rather than technical concerns of specialized branches.**

There is no doubt that ASCE is the oldest of the technical groups.

From Capitol Hill . . .

Dear Editor:

Your article in the March issue concerning Red China was excellent.

The staff of the AMERICAN ENGINEER did a fine job of digging and sifting facts and reports in coming up with this realistic appraisal of the growth which has been made and the threat posed, as a direct result.

Undoubtedly engineering has had much to do with the growth indicated and that in prospect in Communist China.

I am saving the article because of the background facts contained.

WARREN G. MAGNUSON,
U. S. Senator from Washington, and
Chairman, Committee on Interstate and Foreign Commerce,
Washington, D. C.

Red China . . .

Dear Editor:

On page 21 of your March, 1961, issue, you state that the source of your information as to the fact that Red China, "Will be one of the world's scientific giants" was the *New York Times*, a paper "that is generally considered reliable."

Did you know that the *Times* has been found guilty of disseminating misinformation relative to racial trouble in Alabama and the Courts gave the injured parties judgments of one-half million dollars?

Also that on page 18 of the March issue of the *American Legion* magazine, the *Times* reporter, Herbert L. Matthews is given credit for the rapid rise of Communist Castro to power in Cuba; and now according to you, the *Times* is again placing Red China atop the scientific world.

It would seem that for some reason the *Times* has appointed itself a guardian of Communistic nations.

LOUIS COOK, P.E.
Tupelo, Miss.

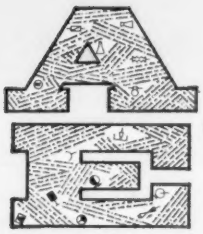
Dear Editor:

I have been a regular and thorough reader of AE for about four years and enjoyed it, and have used it extensively in membership promotion among the few registered engineers in our chapter area, who are not yet members of the society.

No doubt I should have written you many times, commending you and your staff for the excellence of the magazine; however I guess I am the typical member of any national group, I do not put forth the effort to write until I want to complain.

In the March AE your staff article, "Engineering—Red China's Bridge to

(Continued on page 56)



"This Month"

What happened up at MIT last fall would seem to sum up the present state of our ever-changing technology. At that school--for the first time in its history--freshman science majors led those in engineering. So where does engineering go from here? To get some ideas the AE called upon young men whose careers are in the future. Those interviewed are Tau Beta Pi Fellows and the report begins on page 21.

And on page 27 a leading industrial executive discusses "Making the Engineering Team Click". Here are some new thoughts on an old problem.

Page 30 brings us a visit to the World Bank in Washington, D. C. This fascinating organization is important to engineers and one that should be better known.

Did you know that new patents are issued at the rate of 1000 per week? True! That's why engineers should know about patents and the law. An up to the minute report begins on page 35.

We suppose nearly every member of the profession has sadly thought about the present plight of his professional brothers in Cuba. Read "Chaos in Cuba . . . How Revolution Affects Engineers" . . . page 37.

Short subjects of note: A Board of Ethical Review case on page 34, and more about the work of NSPE Veeps, page 40.

"This Month's" news:

General. Page 6. The top news here is NSPE's recent testimony on the proposed National Science Academy. In other stories: New technical manpower talks in Denver . . . Science museum planned for World's Fair . . . How GM engineers work with the doctors in medical research.

Industry. Page 9. In recruiting news, engineering societies have been asked to ban recruiting at meetings. Other headlines: Unions Favor Organizing White Collar Workers . . . Engineer Demand Index Continues to Show Drop.

Consulting. Page 11. This late coverage: Post Office Charged with Farming Out Too Much Work . . . California Bill Will Permit More Use of Consultants . . . Film on Keogh-Utt Bill Made Available to Public . . . Reclamation Bureau Goes Back to Normal Schedule . . . IRS Establishes Rules for Tax Exempt Groups . . . Wisconsin Fines Teacher for Practicing Privately.

Education. Page 13. On another trip to Capitol Hill, NSPE asks Congress to stress graduate scholarships. In other stories we learn that the U. of Rochester will grant an engineering Ph.D. . . . Legislation introduced on the Hill would give U. S. money for 2-year engineering schools . . . A Murray A. Wilson Hall for Men will be built at Kansas Wesleyan U.; Engineer Wilson, of course, is NSPE's president-elect.

Registration. Page 16. Two big stories: A Louisiana judge has ruled as unconstitutional the suspension of the state's registration law for 30 days to allow employees of the highway department to become registered without examination. In another development, the State of Washington has amended its law after a 2-year fight.

Government. Page 17. Again from Washington, a new bill would establsh a separate classification and compensation system for engineers and others. In two other stories the report is that the Dept. of Agriculture has urged its engineers to register . . . And in Philadelphia, city engineers will not have to join a local union.

Kenneth E. Trombley

Editor

NSPE Cites Pros, Cons of Science Academy at Hearing

Pending legislation to establish a National Science Academy must be considered in relation to the over-all engineering and scientific educational posture of the country, both in terms of the present situation and what is currently being planned or proposed for the future, NSPE said in testimony before the House Committee on Science and Astronautics. Executive Director Paul H. Robbins told the Committee that a greater motivation and opportunity must be provided to encourage engineering and science students to pursue and obtain postgraduate degrees. Thus, the pending legislation "should be carefully evaluated in terms of its potential effect on postgraduate engineering education as compared to the relative merit of expanding present programs for which administrative and procedural machinery is now in existence."

Robbins also said that it was the Society's opinion that the expenditure of Federal funds for the construction of academic facilities would be more productive if made available to the 159 existing institutions having accredited engineering curricula, rather than to create a new institution, for the reason that Federal loans or grants to existing schools could be used to supplement facilities currently in operation. "As a result," he added, "we believe that there could be more engineering students educated per dollar expended through Federal loans or grants, than if the same funds were used to establish a new academy."

Robbins told the Committee that one of the most pressing problems in engineering and scientific education today is the ability of existing educational institutions to attract and retain top quality faculties. "This raises the logical question," he said, "of where the Academy would find the qualified professors and instructors for its planned engineering and scientific curricula." Robbins urged the Committee to give careful consideration to how and from what source the proposed Science Academy would obtain its faculty.

Robbins said that the Society favors language in the bill providing for the education of citizens or nationals of friendly foreign states at the proposed Academy. He suggested, however, "that because of the extreme importance of providing educational opportunities for foreign students, particularly in engineering and science, an expanded program should be initiated immediately without waiting for a determination of the more complex question of the feasibility of a science academy."

Robbins said that NSPE endorsed the principle of a Federal Scientific Career Service as proposed in the pending bill but urged the Committee instead to support legislation introduced recently by Representative Anfuso of New York to create a separate classification and compensation schedule for Federally employed engineers and physical scientists.

Representatives Fogarty of Rhode Island, and Karsten of Missouri, have introduced bills to amend and extend the Davis-Bacon Act to "architects, technical engineers, draftsmen and technicians." The Davis-Bacon Act requires the payment of prevailing wages on all Federal construction projects. Present law applies only to "laborers and mechanics" employed directly upon the site of the work. The Fogarty-Karsten bills would cover architects, technical engineers, draftsmen and technicians "employed in the performance of the contract."

Permanent Science Museum Proposed for World's Fair

A bill to provide for the construction of a permanent museum of science and industry in the city of New York as a part of the U. S. participation in the World's Fair of 1964 has been introduced by Rep. Victor Anfuso of New York. Anfuso pictures the museum as a world center "for the exhibition of scientific and engineering achievements which will stimulate and promote scientific and engineering investigation, development and invention, increase the interchange of scientific and technical ideas and knowledge and assist in the development of friendly, sympa-

(Continued on page 8)

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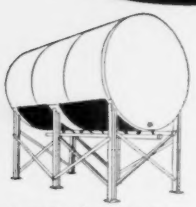

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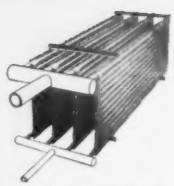

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(Circle 3 in Readers' Service Dept.)

(Continued from page 6)

thetic, and peaceful relations among the peoples of the world."

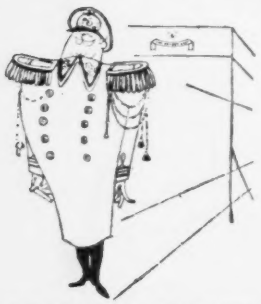
The bill would authorize the President to designate a Federal department or agency to carry out the program, and to appoint a commissioner for the construction of the museum. An advisory committee, consisting of individuals with knowledge or experience in the sciences, engineering or museum construction and administration would be created to assist the commissioner. The twenty-five member advisory committee would be appointed by the President, "who shall give due consideration to recommendations submitted by leading organizations (public and private) and individuals in the fields of science, engineering, and museum construction and administration."

New Institute Works on Air Pollution Problems

Another step was taken recently in the national problem of air pollution control at a meeting of the Industrial Gas Cleaning Institute, Inc., in New York City.

The organization is composed of the manufacturers of equipment designed to remove solid and liquid pollutants from the discharge of furnaces, kilns, chemical processes and other creations of the industrial age. The purposes of the organization are to conduct studies and to do research on methods for improving air pollution control.

The Industrial Gas Cleaning Institute, incorporated in 1960 in the State of New York, was founded to further the interests of manufacturers of industrial gas-cleaning equipment, including, but not limited to, mechanical collectors, electrostatic precipitators, fabric collectors, and wet collectors, by encouraging the general improvement of engineering and technical standards in the manufacture, installation, operation, and performance of equipment; devising and improving methods of analyzing industrial gases; disseminating information on air pollution; the effect of industrial gas cleaning on public health; and general economic, social, scientific, technical, and governmental matters affecting the industry, together with the views of the members thereon. Air pollution is said to cost this nation $13 billion annually in cleaning bills, health and corrosion.



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GM Engineers Contribute to Medical Research

General Motors Research Laboratories engineers have developed a remotely controlled catheter that can be directed through the pulmonary artery into the human heart's cavities and passageways.

It was developed by GM research special problems department in conjunction with Richard J. Bing, M.D. (right in photo), professor of medicine and chairman of Wayne State University's Department of Medicine. Charles W. Gadd (left in photo), supervisor of vibration and stress analysis, headed the engineering project for General Motors. The catheter already has been used on humans and Dr. Bing has indicated it may become an important diagnostic instrument in heart disease. Although precision built, indications are it can be manufactured at reasonable cost for routine use in heart studies and diagnosis.

Catheters, flexible small diameter tubes, are commonly used for measuring blood pressures, obtaining blood samples or making other observations within the human heart. One of their main drawbacks is the impossibility of pointing or directing them once they have been inserted in a patient's vein leading to the heart. Also, when a catheter tip entered the heart chambers, no means was available to aim it toward areas which are of important diagnostic value. With remote control the technique of inserting and routing the catheter and obtaining data from inside the heart may be speeded considerably.

Engineer Gadd, Dr. Bing

Conventional catheters can be used and the new device acts as a stylette. The tip is directed or "steered" by means of this fine wire stylette which transmits tension down the center of a coil spring that extends the four-foot length of the catheter to a point about an inch and a half from the tip. Tension is provided by the doctor's thumb pressure on a plunger-like device, which might be compared with the pumping action of a hypodermic syringe. The first public demonstration of the new instrument was given recently by Dr. Bing at a meeting on rheumatic heart and congenital heart disease in Ann Arbor.

Engineering Societies Asked to Ban Recruiting at Meetings

In an open letter to the officers of major engineering and scientific societies, Van M. Evans, executive vice president of Deutsch & Shea Inc., manpower communications consultants, urged the societies to ban recruitment activities during their meetings and to call upon industry to cooperate in the ban.

Recruiting at conventions, Evans says, has gotten out of hand and features activities more suitable to high pressure sales exhibitions than professional conferences. Many companies, he points out, are reluctant to send their own engineers and scientists to these conventions because of this. Evans believes that many companies carry on convention recruiting only because they feel they must match the competition or lose out. These companies would be glad to give up their "defensive recruiting" at conventions, he feels.

The solution Deutsch & Shea suggests is a complete cessation of all open recruitment interviewing at technical meetings. These four steps are suggested:

(1) That the major societies reach an agreement to ban all interviewing, hospitality suites, advertising for the purpose of promoting recruiting interviews during meetings and conventions of the societies.

(2) That the societies jointly request all companies employing engineers and scientists to agree to desist from such recruiting efforts, including the use of outside groups or individuals acting as agents for the company during the days of meetings and conventions.

(3) That the societies urge their members to cooperate fully in this action as a means of freeing professional meetings from the distractions and encumbrances of recruiting efforts.

(4) That these restrictions be understood to apply to professional society meetings and conventions and would not in any way restrict the individual at other times from seeking a position, nor interfere with whatever facilities the society itself may have already developed to aid its members in finding suitable employment.

Such a move, according to Evans, will restore dignity to professional conferences, make companies more willing to send their technical people to these meetings, and improve the exchange of technical information which is the basic purpose of the conventions.

Unions Favor Organizing White Collar Workers

Unions are just about unanimous in calling for organization of white collar workers, but internal bickering has flared over who should do the job.

Speaking before the Industrial Relations Research Association in St. Louis, Everett Kassalow of the AFL-CIO's Industrial Union Department kicked off the dispute. It was his personal opinion, said Kassalow, that any future success in white collar organizing would and should come from IUD's production unions.

Seeing this as a threat to their future, the Office Employes International Union was quick to reply. "We are the only organization chartered by the AFL-CIO to organize office and clerical employees regardless of industry," said Director of Organization Henderson Douglas. To back up this mandate Douglas said that production unions do not understand the white collar mind, and are "no longer an important factor in organizing white collar workers." OEIU President Howard Coughlin fired off a letter of protest to IUD President Walter Reuther.

The second challenge came from the American Federation of Technical Engineers, AFL-CIO. Edward J. Coughlin, AFTE secretary-treasurer (no relation to Howard), charged that production union meddling in white collar elections has split up votes and hurt all unions.

"Thus I take issue with the assumption that the industrial unions are the ones to organize the engineers and technicians now or in the future," said Coughlin. "It is the duty of AFTE to do this work and

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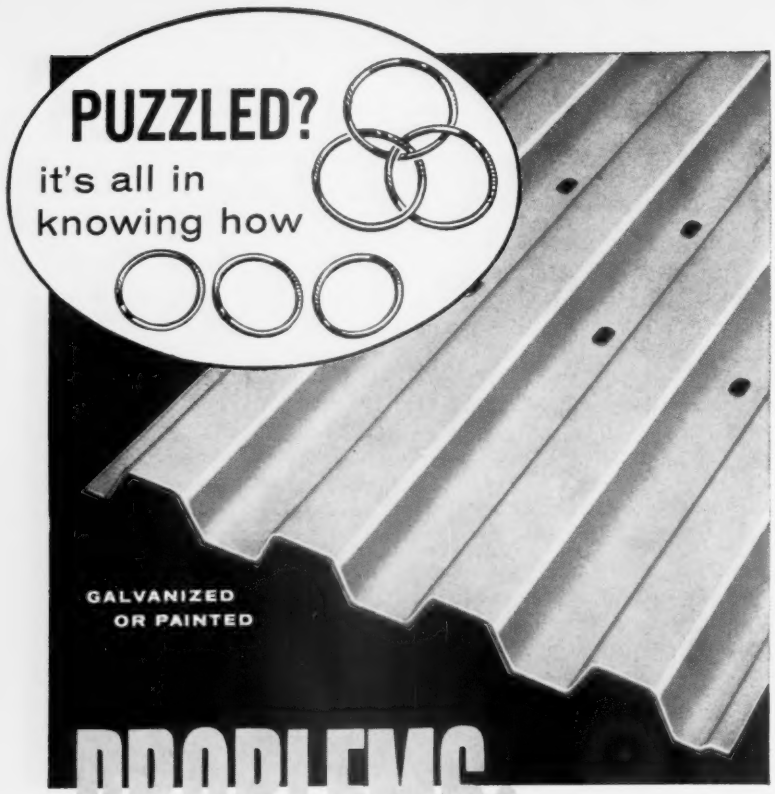

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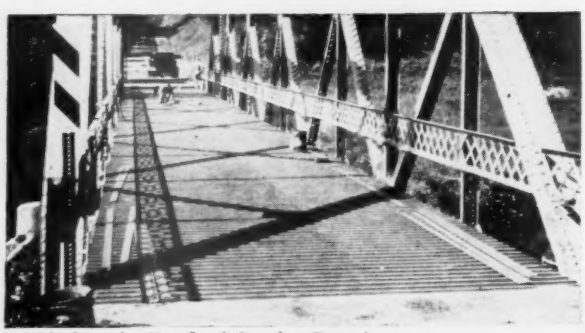

(Circle 6 in Readers' Service Dept.)

I pledge to all our members we will do all in our power to protect their standards and interests in this endeavor." In spite of the strong language in the two protests, neither was answered by the IUD.

Now, say the two craft unions, the IUD has frozen them out of an April white collar workshop, the second such snub in two years. Russell Stephens and Howard Coughlin, respective presidents of AFTE and OEIU, have sent a joint letter to Reuther demanding an investigation of their claims.

"We cannot help but arrive at the conclusion," they stated, "that those in charge of the activities of the Industrial Union Department are using devisive (sic) tactics which accrue to the disadvantage of those craft-like organizations, such as the AFTE and OEIU."

The IUD finally broke silence to say that no slight was intended in setting up the workshop. The spokesman implied, however, that the latest demand would still get no official recognition.

Engineer Demand Index Continues to Show Drop

Continuing the downtrend begun in November, 1960, the demand for engineers and scientists dropped again in February according to the Deutsch & Shea Engineer/Scientist Demand Index. The drop was not a large one: 103.4 for February as compared to 107.0 for January. In the past, the demand for technical men has served as a kind of lead indicator for the economy, changes in demand often occurring several months before being reflected elsewhere in the economy. If this holds true, February figures would indicate that any economic upswing is still some months away.

An examination of the subindices figures which contribute to the over-all Index shows that the placement of display newspaper advertising dropped sharply in February. Classified newspaper advertising, on the other hand, gained slightly, and technical journal recruitment advertising shows a drop of only .1.

Post Office Charged With Farming Out Too Much Work

The payment of $400 per day to a private consulting firm by the Post Office Department has been called "excessive" and "exorbitant" by a House Appropriations subcommittee.

The charges were made at a recent hearing on Post Office appropriations for fiscal 1962, and were directed primarily at the Post Office under the Eisenhower administration. J. Edward Day, President Kennedy's newly appointed Postmaster General, agreed with the Congressmen on the principle that the Post Office should do more of its own "consulting" and farm out less to private firms and individuals.

Representative Vaughan Gary of Virginia, chairman of the subcommittee, said the Post Office's statutory limit was $60.88 per diem for individuals. He noted, however, that the Comptroller General had ruled that this limitation applied only to individuals, and not to contracts with consulting firms. Without saying what services had been received for the $400 per day, Gary said that ". . . the members of this committee felt that it was a very excessive price for the Department to pay for work of that kind."

Post Office officials testified that in the past "almost all" of the Department's engineering work had been done by consultants. Postmaster General Day said, however, that he prefers to use Government experts, and that any new outside engineering contracts will get a "very searching" examination.

Calif. Bill Will Permit More Use of Consultants

A bill awaiting action by the California Legislature would broaden the state policy on use of private engineers and architects.

Under the new engineer-backed measure, private consultants will be used whenever the Board of Public Works decides the state engineering force will be unable to do the work "adequately, competently, and satisfactorily."

The present law makes no mention of the state force's qualifications for a given project, but provides for use of consultants only when "the obtainable staff is unable to perform the particular work within the time the public interest requires such work to be done."

In addition, the bill provides for a Public Works Board Advisory Committee to help the Board of Public Works pick consultants in the event state forces cannot do the work. The advisory committee would select at least three qualified engineers or architects from which the board would make its choice.

Film on Keogh-Utt Bill Made Available to Public

The American Thrift Assembly has prepared both a film and a pamphlet describing the principal features of the new Keogh-Utt bill, H.R. 10. Currently awaiting action by the Ways and Means Committee, this new self-employed retirement bill is the most prominent of over twenty now before the House of Representatives.

The fifteen-minute color film (16mm) is available on loan for showings to groups of consultants or others interested in self-employed retirement legislation. It may be ordered directly from the American Thrift Assembly, Room 612, 1025 Connecticut Avenue, N.W., Washington 6, D.C. The ATA asks that requests list three dates in order of preference, and include $3 to cover shipping and handling. The free pamphlet is available in quantity upon request to NSPE headquarters.

Reclamation Bureau Goes Back to Normal Schedule

The Bureau of Reclamation reports that its Denver office staff engineers are almost all back on a normal work schedule following a temporary speed-up.

This was learned in discussions with Reclamation officials who pointed out that the temporary program was in line with President Kennedy's government-wide order to spur public works as an anti-recession measure. The Denver Reclamation engineers had been working a 58-hour week to finish design work and move up award dates for construction and equipment contracts.

Reclamation spokesmen told NSPE that the speed-up was limited to projects already well into the design phase, making their transfer to private consultants impractical. They estimated that bidding for construction and equipment had been moved up by several months over normal scheduling.

Reclamation is now using consultants on a limited basis for specialized needs outside the scope of the Denver engineering staff and

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expects to continue this policy. In an address to NSPE at Denver last October, Reclamation Commissioner Floyd E. Dominy said, "It is essential that the joint efforts of engineers in the Federal establishments and those in private practice be continued if we are to meet the needs and solve the problems of today and tomorrow." Under a new expanded program awaiting Congressional appropriations, more consultants will be needed to meet scheduled peak load requirements. Some of these contracts are already under negotiation with consultants.

Bureau officials said they concentrate on maintaining a permanent career-type staff to handle normal requirements without periodic hirings and lay-offs. This means that more consultants may be used in the near future if the Reclamation program expands beyond present staff capacity for a temporary period. President Kennedy has revoked the "no-new-starts" policy of the former Administration, but exact requirements for both staff and consultant use will depend on actual Congressional action.

IRS Establishes Rules for Tax Exempt Groups

The Internal Revenue Service has announced a new set of proposed regulations defining tax-exempt "scientific" organizations. The new proposals are intended to be substituted for regulations proposed in December, 1959, which have since been withdrawn. To be classified as "scientific," an organization must meet the following criteria:

- **Its research must be in furtherance of a scientific purpose.** The determination as to whether research is "scientific" does not depend on whether such research is classified as "fundamental" or "basic" as contrasted with "applied" or "practical." Scientific research does not include activities of a type ordinarily carried on as an incident to commercial or industrial operations, *i.e.*, ordinary testing or inspection.
- **It must be organized and operated in the public interest.** Scientific research will be regarded as carried on in the public interest if the results of such research are made available to the public on a nondiscriminatory basis; if such research is performed for the United States, its agencies, or for a State or political subdivision; or if such research is directed toward benefiting the public (such as research to discover a cure for a disease).

An organization will not be regarded as organized and operated for the purpose of carrying on scientific research in the public interest if it will perform research only for persons which are its creators, or if it retains the ownership or control of more than an unsubstantial portion of the patents, copyrights, processes or formulae resulting from its research.

Wisconsin Fines Teacher for Practicing Privately

A high school industrial arts teacher has been found guilty and fined for practicing architecture without being registered or exempt from registration under Wisconsin law. Charges were brought against the defendant by the Wisconsin Registration Board of Architects and Professional Engineers.

The complaint charged that the defendant violated the law by preparing plans and specifications and supervising the construction of additions and alterations to school buildings in the Waupaca County area. It was also alleged that he used business stationery which advertised architectural, industrial and commercial design services. The defendant did not contest the charges against him.

In assessing the penalty, the Judge warned the defendant to comply fully with the rules of the Wisconsin Registration Board and existing statutes governing the practice of the professions of architecture and engineering. It was pointed out, however, that while the defendant individually entered into a contract with the school board for the performance of professional services on a fee basis, plans were sealed by a professional engineer and were approved by the State of Wisconsin Industrial Commission. (*Registration Board v. Morgan*, Circuit Court Branch, Waupaca County Court.)

Meetings of Note

Society of American Military Engineers—Annual Meeting, May 15-16, Mayflower Hotel, Washington, D.C.

Design Engineering Show—May 22-25, Cobo Hall, Detroit, Michigan.

American Nuclear Society—Annual Meeting, June 4-8, Penn-Sheraton Hotel, Pittsburgh, Pennsylvania.

Society of Automotive Engineers—Summer Meeting, June 4-9, Chase-Park Plaza Hotel, St. Louis, Missouri.

American Society of Mechanical Engineers—Summer Annual Meeting, June 11-14, Statler Hilton Hotel, Los Angeles, California.

Air Pollution Control Association—Annual Meeting, June 12-16, New York, New York.

American Society of Agricultural Engineers — Annual Convention, June 23-24, Governor House, Jefferson City, Missouri.

American Society for Testing Materials—Annual Meeting, June 25-30, Chalfonte-Haddon Hall, Atlantic City, New Jersey.

American Society for Engineering Education—Annual Meeting, June 26-30, University of Kentucky, Lexington, Kentucky.

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NSPE Tells Subcommittee to Stress Graduate Scholarships

"The real problem facing the Nation with respect to engineering manpower lies at two poles—the need to expand and stimulate graduate education, and the need to encourage and support technician education programs," the National Society recently told Congress. Testifying before a House Education Subcommittee on the Administration's higher education program, Paul H. Robbins, NSPE executive director, said that President Kennedy's proposed five-year Federal undergraduate scholarship program places the emphasis in the wrong area.

"We believe," Robbins said, "that the primary concern of the Federal Government should be with improving the quality of our college students, not their quantity. In other words, it is our opinion that the greatest need lies in the field of postgraduate education and fellowships, rather than in undergraduate scholarships."

Urging that the education of engineering technicians be covered by a proposed Presidential study of vocational aid, Robbins pointed out that there is a growing need for encouragement and support of technician education programs. "It is a generally accepted fact today," he said, "that improved efficiency in the utilization of our country's engineering manpower is directly related to the extent to which trained engineering technicians are available to relieve the engineer from many routine, repetitive tasks."

Robbins told the Subcommittee that the National Society supports President Kennedy's proposal to establish a new loan program, similar to that currently in effect for college housing, to assist in the construction, renovation, modernization and rehabilitation of classrooms, laboratories, libraries and related structures and equipment.

Univ. of Rochester Will Grant Engineering Ph.D.

Vigorous growth of the College of Engineering, University of Rochester, is indicated by the authorization to grant the Ph.D. in mechanical engineering, effective this fall and recently approved by the University Council on Graduate Studies.

Ph.D. degrees are now granted in two departments of the College of Engineering—chemical and electrical engineering. The degree in mechanical engineering will complete the Ph.D. programs in the three departments of the College. In chemical engineering there are seven Ph.D. degree candidates, and in electrical engineering, five; and seven are expected in mechanical engineering by September.

Said Dr. Martin Lessen, chairman of the Department of Mechanical Engineering, in announcing the new program, "The University of Rochester recognizes the need of our society for applied scientists, and wants to take its rightful role in filling its share of this need."

Van Zandt Bill Promotes 2-yr. Engineering Schools

Representative James E. Van Zandt of Pennsylvania has introduced legislation to provide Federal assistance to establish two-year branch colleges offering programs of study in engineering and the physical and natural sciences, and Federal assistance to help public institutions of higher education establish two-year associate degree programs in the technologies. The Van Zandt bill would also extend and expand the present loan pro-

Goals for Engineering Education . . .*

"Engineering. The long-term goal is to have students who are preparing for a professional career devote their undergraduate years to a liberal arts program with heavy emphasis on mathematics and the sciences. Undergraduate programs to prepare students for employment in various technologies should not be labelled 'professional' and should not be regarded as suitable preparation for graduate work in engineering.

"The future need for engineers will be great, and the colleges must expand their output. But numbers are less important than quality. We don't just need more engineers, we need more good engineers. The emphasis on mathematics and science as an ingredient of engineering education will have to be *very much* stronger.

"The present 10,500 (full-time equivalent) engineering faculty should expand to at least 17,500 by 1970. Engineering education will need a faculty capable of teaching engineering at a higher level and with a deeper knowledge of mathematics and science. We should expect that 40 per cent of the engineering faculty will hold the Ph.D. (as against 27 per cent in 1959)."

* From *Goals for Americans, The Report of the President's Commission on National Goals,* Prentice-Hall, Inc., 1960, p. 94, "National Goals in Education" by John W. Gardner.

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gram of the National Defense Education Act and would make such loans available through private two-year technical institutes.

In order to assist colleges to establish or expand programs of pre-engineering study, Rep. Van Zandt proposes that the Federal Government enter into contracts with the institutions whereby the Government would provide up to 50 per cent of the costs. Such costs could include salaries of teaching and administrative personnel, or the cost of material and equipment used in classrooms and laboratories.

The other portion of the Van Zandt aid-to-technician-education proposal relates to Federal assistance to institutions of higher education for the establishment and operation of two-year associate degree programs in the technologies. Contracts covering not more than 50 per cent of the costs of such programs would be authorized in the fields of engineering and the physical and natural sciences with respect to those technologies in which the Commissioner determines there is an insufficient number of persons with semiprofessional training to fully assist engineers and scientists.

Wisconsin U. to Exchange Engineers With Mexico

The University of Wisconsin's College of Engineering and the Mexican Institute of Technological and Advanced Studies at Monterrey, Mexico, will cooperate in a unique program for the training and education of American engineering students at the Mexican institution during the next two years.

The program, first of its kind in the history of United States-Mexican higher education, was made possible with acceptance of a $100,000 grant by the UW Board of Regents from the Carnegie Corporation of New York. The funds will support a junior year program for UW engineering students at the Instituto Tecnologico y de Estudios Superiores de Monterrey, Mexico.

The program is a pioneering undertaking in the field of student exchange with foreign universities in a professional area. The first year is planned as a pilot study involving only UW engineering students, but it may be extended to other American universities later.

Because of the modern significance of technology in international affairs, it is felt that the program can be important both from a technological standpoint and the standpoint of greater improvement in international relations. A broad cultural training of the UW engineers is an added important benefit.

Besides the College of Engineering, the University Extension's correspondence study department and the University's department of Spanish and Portuguese are cooperating in the program. Under the program, eight UW engineering students, after special Spanish language and cultural training, will spend their junior year at the Mexican institution of higher learning.

NSPE President-elect Honored on Kansas Campus

At recent cornerstone laying ceremonies held on the campus of Kansas Wesleyan University in Salina, a new $493,000 men's dormitory was officially designated as the "Murray A. Wilson Hall for Men." This honor was extended to Wilson, NSPE president-elect, in recognition of his many years of service to that institution.

The building, under contract to Johnson Builders, Inc., of Salina, is designed to house 152 college men. The building is designed as a reinforced concrete frame structure with masonry walls, liberal use of wall glass, and features solar tile for decorative and sun control purposes.

The main lounge, lobby and reception room are located on the first floor. The reception desk is the communication center for a two-way communication system in the building. Study lounges are centrally located on the second and third floors. The building is fully air conditioned and furniture such as beds, dressers, desks, wardrobes, and bookshelves are built in and included in the over-all cost of the building.

Murray Wilson has served on the Board of Trustees of the University for many years, was chairman of the Board of Trustees from 1949 to 1954, and has served as chairman of the Executive Committee for Kansas Wesleyan since 1955. He was awarded the honorary degree of Doctor of Humane Letters by the University in 1953.

His interest in other Kansas schools of higher learning is exemplified by the Citation of Merit received from Baker University in 1954 and a Distinguished Service Award from Kansas State University in 1957.

Wilson will take office as president of NSPE in July.

Murray A. Wilson Hall for Men

Northwestern U. Seeks Professor for Khartoum

At the request of the State Department, Northwestern University is planning to renew its five-year contract with the University of Khartoum in the Sudan, an arrangement aimed at helping develop the engineering and science program in the University of Khartoum. The program, which was originally aimed at helping civil engineering, has now been expanded to include all branches of engineering as well as science. The program, during the past five years, has been outstandingly successful and has led to a valuable exchange of information and staff between the two universities.

In connection with the cooperative agreement between Northwestern University and the University of Khartoum, Sudan, a mechanical engineering staff member is needed for either a one or two-year period beginning July 1, 1961, for the College of Engineering, University of Khartoum. The requirements are either an advanced degree in mechanical engineering or practical experience, preferably in internal combustion machine design or thermodynamics. Anyone interested should contact Dr. John A. Logan, chairman, Department of Civil Engineering, Technological Institute, Northwestern University, Evanston, Illinois.

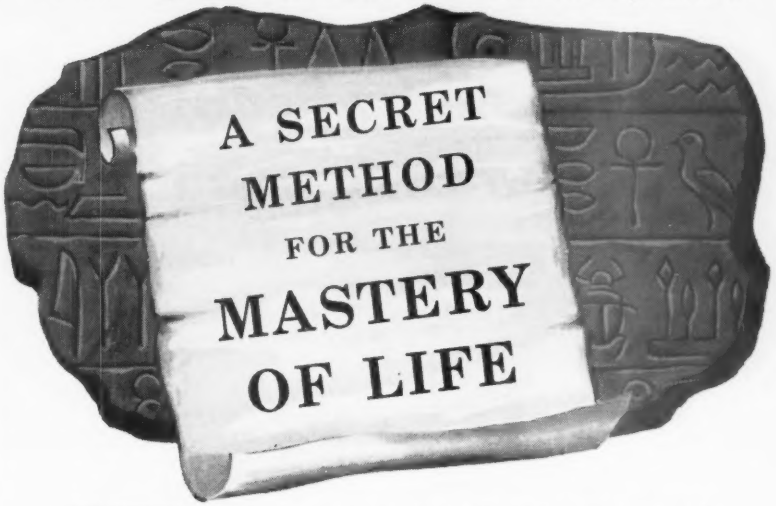
Truitt to Head Engineering at North Carolina State

An aerospace engineer and noted author of technical publications has been named head of North Carolina State College's Department of Mechanical Engineering.

Dr. Robert W. Truitt has resigned as professor and head of the Aerospace Engineering Department at Virginia Polytechnic Institute, Blacksburg, Va., to accept the North Carolina State College position, effective June 1.

Dr. Truitt has been actively engaged in the research and development of the Nation's missile and space programs. His major fields are energy systems for space operations, hypersonic aerodynamics for re-entry space vehicles, and heat transfer problems.

Knowledge That Has Endured With The Pyramids



WHENCE came the knowledge that built the Pyramids and the mighty Temples of the Pharaohs? Civilization began in the Nile Valley centuries ago. Where did its first builders acquire their astounding wisdom that started man on his upward climb? Beginning with naught they overcame nature's forces and gave the world its first sciences and arts. Did their knowledge come from a race now submerged beneath the sea, or were they touched with Infinite inspiration? From what concealed source came the wisdom that produced such characters as Amenhotep IV, Leonardo da Vinci, Isaac Newton, and a host of others?

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Judge Deems La. Registration Suspension Unconstitutional

In an injunctive proceeding, a New Orleans District Court has declared invalid and unconstitutional the provisions of two resolutions of the 1958 session of the Louisiana Legislature which suspended the State's engineering registration law for a period of 30 days to permit employees of the Highway Department and State Conservation Department to obtain licenses without examination. As a result, the State Board of Registration has been prohibited from renewing licenses which had previously been granted to four individuals under the 1958 legislative actions.

The case against the Board was filed by a group of individual professional engineers who claimed that the resolutions violated the State Constitution in several respects. Their main contention was that the two resolutions not only attempted to "suspend" the law, but to "amend" it as well, and that in seeking to "amend" the law, the resolutions violated the State's constitutional provisions for the enactment of legislation.

The Louisiana Engineering Registration Act of 1950 contains a "grandfather clause" which provides that "any person employed on a full time salary basis by the State of Louisiana or any of its political sub-divisions" on the effective date of the Act "to perform duties requiring the practice of civil engineering" could apply within one year for registration without examination. The 1958 resolutions attempted, in effect, to revive this "grandfather clause" for 30 days because some employees in the Highway and Conservation Departments were not "notified of their right to receive licenses to practice engineering when this Legislature gave all engineers with experience and qualifications the privilege of registering."

In its opinion, the Court ruled that the two resolutions not only attempt to suspend the law but they attempt to amend the law, and that although the Legislature may properly suspend a law by resolution, only a legislative bill duly enacted in accordance with the requirements of the Constitution can change the law. The two resolutions, the Court continued, "violate all of the constitutional provisions for the enactment of legislation . . . of the Louisiana Constitution."

In a separate action the engineers unsuccessfully sought a declaratory judgment holding two 1959 resolutions invalid as well. One would permit registration without examination of state employees as "civil engineers" who are employed by the highway department and who are performing the work of civil engineers for the state. The other would permit the licensing of other state employees as "highway engineers."

(*Rayner v. State Board of Registration*, Nos. 376-976 and 381-729, Civil District Court for the Parish of Orleans)

Two Years' Effort Amends Wash. Registration Act

The Washington State Legislature has recently approved several major amendments to the State's Engineering Registration Act. Significant changes were made in the sections pertaining to corporate practice and in the sections including definitions of misconduct or malpractice.

Language in the Act which authorized the practice of engineering by a corporation or joint stock association was due to expire on December 31, 1961. Amending language removed this limitation, but at the same time tightened the requirements for corporate practice.

Under the new language, the registration board need not issue a certificate of authorization to a corporation until it is satisfied that "the applicant corporation is possessed of the ability and competence to furnish engineering services in the public interest." In making this determination, the board will evaluate several findings and items of information required of the applicant corporation. For example, the by-laws of the corporation must contain provisions that all engineering decisions shall be made by or under the direction of registered professional engineers whose names have been specified to the board. The application for a certificate of authorization must state the types of engineering practiced and the professional records of the designated persons who shall be in responsible charge of each project, and each major branch of engineering activities in which the corporation shall specialize.

In addition, the corporation must file with the board a current certified financial statement accurately reflecting the financial condition of the corporation. Finally the board must determine that the corporation has the ability to provide, through qualified engineering personnel, professional services or creative work requiring engineering experience.

In another major area of change the 1961 amendments added four additional practices that could constitute misconduct or malpractice. These are derived in large part from the Canons of Ethics and Rules of Professional Conduct. The four new additions relate to having a conflict of interest which could affect a decision regarding engineering work; failure to disclose a business interest which may compete with or affect the business of the client or employer; unfair competition by reducing a quoted fee after being informed of the fee quoted by another engineer; and soliciting employment by advertisement which is undignified, self-laudatory, false or misleading.

New Salaries for Government Engineers Proposed by Anfuso

Legislation to establish a separate classification and compensation system for professional engineering, physical science and mathematics positions in the Federal service has been introduced by Representative Victor L. Anfuso of New York. The bill, H.R. 5563, calls for a ten grade Professional Engineering-Scientific (PES) schedule with salaries starting at $6400 and going up to $20,000.

Anfuso said the primary purpose of his measure is to improve the Government's competitive position in the recruitment and retention of engineering and scientific personnel through a system which assures adequate salaries and professional prestige. According to Rep. Anfuso, the salary levels assigned to each of the grades are comparable to current rates for similar classes of employees in non-Government employment.

The bill provides for the Civil Service Commission to place in the new schedule all positions in the engineering, physical science and mathematics occupational groups which require professional qualifications. In order to guide the Commission in determining which positions should be included, the bill contains definitions of engineering, physical sciences and mathematics groups in terms of the type of work performed and the qualifications required.

Initial conversion from the present general schedule to the new PES schedule would be as follows: The salary of each employee who is transferred to the new schedule would be initially adjusted to a comparable rate which does not result in a decrease. For example, an engineer presently at the third step of grade GS-12 earning $9475 a year would become a PES-4, and his salary would be adjusted to the nearest dollar figure at the PES-4 grade which does not result in a decrease. In this case his new salary would be $11,200.

A significant feature of the Anfuso bill provides that after two years from the time the new system becomes effective, no person can be apppointed, promoted or transferred to the PES schedule unless he holds a bachelor's degree signifying graduation from an accredited engineering, physical science or mathematics curriculum, or is licensed as a professional engineer or certified as an engineer-in-training. Anfuso said this provision "will serve to raise the standards for the new schedule and assure continued professional qualifications among individual engineers, physical scientists and mathematicians placed in the Professional Engineering-Scientific system."

The bill provides for periodic in-grade step increases, eligibility for promotions to higher grades upon completion of required periods of service, and overtime compensation for employees in grades PES-1 through PES-5. Employees in grades PES-6 and above would not be entitled to either overtime pay or compensatory time off for any work performed in excess of forty hours in any administrative work week. Anfuso said that this provision reflects the fact that employees in these grades exercise considerable independent judgment and discretion in performing their duties and that a certain degree of flexibility may be required in the time spent to complete assignments or projects. "Such an arrangement is in accord with accepted practices involving engineering and scientific personnel in higher level positions in private areas of employment," he added.

The Anfuso bill is similar to the Moss-Gubser separate schedule bills of previous sessions of Congress, except that it is more restrictive in application. The proposed PES schedule would include only professional engineering, physical science and mathematics positions, whereas the Moss-Gubser proposals would have covered a variety of professional level job categories. Many observers believe that Moss-Gubser's application to such a wide variety of professional positions only served to confuse the basic issue and that it was primarily because of this feature that the bills failed to receive serious consideration by Congress.

Agriculture Dept. Urges Its Engineers to Register

A recent memorandum to all engineer employees declares that it is the policy of the Department of Agriculture's Soil Conservation Service "not only to encourage SCS engineers to register, but to promote such action." The official memorandum was signed by Donald A. Williams, SCS administrator, and cites several reasons for the SCS policy: (1) Registration gives recognition to the Government engineer and adds prestige both to him as an individual and to the agency he represents; (2) it engenders a feeling of pride and responsibility that encourages a man to do his best work; and (3) it gives him personal satisfaction in the practice of his profession and stature among members of the profession.

It is becoming more and more

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important to the Service to maintain professional stature and to command the respect of other professional engineers, the memorandum said. "Watershed work, especially, requires an increasing number of contacts and, at times, close working relations with both private consulting engineers and engineers from other agencies. Registration is an important step toward maintaining respect."

State Conservationists were requested to initiate an active campaign in their respective states toward interesting qualified key engineers in becoming registered as professional engineers. The memorandum observed that in many states only a registered private engineer is eligible to sign plans and specifications for water control structures and submit them for approval by the authorized state official. "We feel that the Service should have enough registered engineers in each state to operate on a reasonably comparable basis and to assure the establishment and maintenance of professional confidence in our engineering competence on the part of the state."

City Engineers Exempted from Local Union Contract

Engineering and other professionals employed by the City of Philadelphia will not be affected by a mandatory membership clause in a new labor contract between that city and the American Federation of State, County and Municipal Employees, AFL-CIO. The provision is a watered down version of a controversial union shop clause proposed two years ago. As originally proposed by the union, the clause would have covered all non-uniformed municipal employees. However, opposition from the Philadelphia Chapter of the Pennsylvania Society of Professional Engineers and resistance from city engineers combined in the effort that led to its defeat.

Most of the classifications covered by the union membership requirement involve blue collar workers. A top city engineering executive said last week that engineering and other professional workers have been assured that they will not be obliged to join the union.

Strictly Business

Personalities . . . **Dr. Samuel Hopfer** has been promoted to the position of manager of research at **PRD Electronics, Inc.** of Brooklyn . . . **J. Philip Murphy** was recently elected president of **Yuba Consolidated Industries, Inc.** of San Francisco . . . **Carl W. Dahl** has joined the Engineering and Construction Division of **Koppers Company, Inc.,** Pittsburgh, as manager of the Industrial Relations Department . . . **Donald R. File** has been appointed manager of the Rochester, Pa., plant of **Dravo Corporation's** Keystone Division . . . **Ralph C. Sampson** has been appointed director of customer engineering for the Data Processing Division of **International Business Machines Corporation,** White Plains, N.Y. . . . **Frank V. Smith** has been named successor to retiring Alf Kolflat as partner of **Sargent & Lundy Consulting Engineers** of Chicago . . . **Arthur M. Saggs** has been promoted to manager of the Columbia sales office of **The Trane Company** . . . **Lindell D. Hale** has joined the consulting firm of **Clyde E. Williams** in Indianapolis . . . **Burns & McDonnell Engineering Company** of Kansas City, Mo., recently admitted to partnership in the firm **Leo L. Cunningham, Jasper W. Meals, Alwin H. Rector, William W. Rumans** and **Edwin J. Rumans** . . . **Eugene M. Hunter** is the new manager of **General Electric's** power transmission engineering operation in Schenectady.

Dr. Hopfer

Robert A. Beer has been appointed vice president and general manager of the new Washington, D.C., office of **Ivor B. Clark Co., Inc.** . . . **Glenn L. Werly** of **Mobil Oil Company** has been selected by the **Oil Heat Institute of America, Inc.,** organization committee as president of the newly formed one roof fuel oil organization . . . **Arthur W. Flynn** has joined **Ebasco Services Inc.** as a nuclear engineer . . . **Montague S. Hasie, III** has returned to Lubbock, Texas, to become associated with **Hasie & Green and Associates, consulting engineers** . . . Promotion of **Edward A. Smith** to chief product engineer was announced recently by The Chicago Screw Company, division of **Standard Screw Co.** . . . The appointment of **Frank J. Chambers** to assistant manager, parts supply, has been announced by the Electro-Motive Division of **General Motors** . . . **Thomas Hollingsworth** has been elected vice president in charge of sales of **Hubbard and Company** of Chicago . . . **Robert M. McClintock** has joined **Avdel, Inc.,** as chief engineer . . . **The Martin Company** of Baltimore has named **Dr. Charles E. Crompton** to head its new Nuclear Chemistry Department.

Mr. Beer

F. Morgan Taylor has been named marketing manager of Ramset Fastening System of **Olin Mathieson Chemical Corporation** in New Haven, Conn. . . . **Sheldon K. Towson, Jr.** has been elected president and chief executive officer of **The Elwell-Parker Electric Company** of Cleveland . . . **Dictograph Products Inc.** has elected **Walter E. Froelich** to the newly created post of executive vice president . . . **Eugene F. Shaw** has been elected vice president of **Sedan Associates** of Detroit . . . The election of **Glenn Herz** and **James L. Woodley** as vice presidents of **Hyster Company** of Portland, Ore., was announced recently . . . **Electro Lighting Corporation** of Chicago, has announced the appointment of **Steward E. Robinson** as vice president in charge of eastern sales . . . **Nathaniel R. Kidder** has been appointed to the newly created post of manager of marketing services for Jack & Heintz, a division of **The Siegler Corporation** . . . **T. A. Bedford** has been elected president and director of **Henry J. Kaiser Company Ltd. of Canada** . . . **R. McLean Campbell** has been elected to the board of directors of **The Flintkote Company** of New York City . . . **Ralph H. Sayre, Jr.** has been appointed director of engineering of **CIBA Pharmaceutical Products, Inc.** of Summit, N.J. . . . **William C. Nusbaum** has been elected vice president of **Day-Brite Lighting, Inc.**

Mr. Taylor

Mahlon E. Wood has been appointed market development engineer for **American Zinc Institute** . . . **William A. Finn** has been elected vice president—group executive of **Worthington Corporation** . . . **John T. McCann** has been named as executive vice president of the **Mechanical Contractors Association of America, Inc.** . . . **E. F. Clark,** New York State director of highways transportation studies, has recently completed an assignment as member of a United Nations Transportation Study Team to Caracas, Venezuela . . . **Hooker Chemical Corporation** has elected **Thomas E. Moffitt** as chairman of the board and chief executive officer . . . **DeWalt, Inc.** of Lancaster, Pa., has elected **Francis H. Gerlach** as vice president of engineering . . . **Key Resistor Corporation** of Gardena, Cal., has appointed **Martin Mann** as national sales manager . . . **Oilgear Company** has appointed **Ernst Wiedmann** as vice president and director of engineering . . . **Gee & Jenson Consulting Engineers, Inc.** recently announced the addition to their staff of **W. Turner Wallis** . . . **Marshall A. Williams** has been named executive director of marketing at **Simplex Wire & Cable Co.** of Cambridge, Mass.

Mr. Wood

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How Young Engineers View The Space Age

Now that the Russians have successfully put a man into space, the challenge to American engineering—and particularly the young engineer—is clear. This is how one group of outstanding young engineers feels about the situation, and how they view the future.

SHORTLY after the Russians put Sputnik I into orbit and the space age began, there occurred a somewhat miraculous transformation. It was a change that was noteworthy even in a nation where hundreds of advertising and public relations agencies work full time to create images—corporate, personal and otherwise.

The scientist, formerly an absent-minded and nearsighted Walter Mitty slaving in a chaotic basement laboratory on problems of no concern to anyone at all, was reborn. The new image looked like something out of a cigarette ad: Young, rugged, suntanned, squinting into the Florida sunshine from under the brim of his hard hat.

The effectiveness of the image is perhaps best indicated by a single but significant statistic: For the first time in its history, last fall Massachusetts Institute of Technology had a greater number of its incoming freshmen elect science as their major field, rather than engineering.

In the eyes of the public the prestige of science as a profession went into orbit as effectively as Sputnik had, and there seemed to be many indications that engineering had suffered in the process. By an indeterminable and strange process of reasoning, the situation came to be regarded as this: Where engineers had failed to beat the Russians into space the scientists had come along and saved the day.

Certainly no comment is needed on the accuracy of this reasoning, for it can only be explained in terms of the general confusion that reigned in the minds of the public, when faced with a new and embarrassing situation vis a vis Russia. Disregarding the general misconceptions that appeared at the time, what actually was the effect of Sputnik on the engineering profession, both in terms of the short term and long range results? Given about three and a half years for people to get used to the idea of the space age, and resultant perspective, it is perhaps worth trying to see what has really happened.

To do this, AMERICAN ENGINEER collected the opinions of this year's winners of the Tau Beta Pi engineering Fellowships. The Tau Beta Pi Fellows represent a cross-section of the branches of the engineering profession—chemical, electrical,

mechanical and aerospace. Also, they offer good geographical coverage—West Virginia, Louisiana, Wisconsin, Arizona, Florida, and Texas.

But most important, their opinions are based on a firm understanding of the engineering profession, close personal involvement with the situation outlined above, and a high level of intelligence which qualified them for the Fellowships in the first place. Further, because the Fellows are not yet practicing engineers their opinions have the advantage of being something of a fresh approach to the situation. AMERICAN ENGINEER also felt that since these future engineers had started their engineering education prior to the launching of Sputnik, they might be able to point up resultant differences in their own attitudes.

The response to our queries to the Fellows was gratifying. Answers received were responsible, thoughtful, and altogether professional. Recurring points of emphasis in the letters are ones that bring what is perhaps the most logical line of reasoning to bear on the effect of Sputnik on the engineering profession. Throughout we found replies that showed a deep sense of professional responsibility and an idea of public service which scrupulously avoids the hysteria that has greeted the Russian challenge in space in many quarters.

The questions AMERICAN ENGINEER asked were these: What were your original reasons for choosing engineering as a profession? Have these reasons changed since you began your academic work, and more specifically, since Sputnik was launched? Do you feel that as a result of Sputnik you will be able to get a better job upon graduation and be able to advance faster once you begin working as a full time professional engineer? Do you feel that engineering professionalism has been enhanced or harmed by Sputnik? Do you feel there is a need for a higher level of education for the individual engineer as a result of increasing technology? Do you feel that engineering has suffered from recent emphasis on science in connection with such events as satellite launchings? Do you feel your undergraduate curriculum offered you a broad enough base in the sciences, as opposed to engineering?

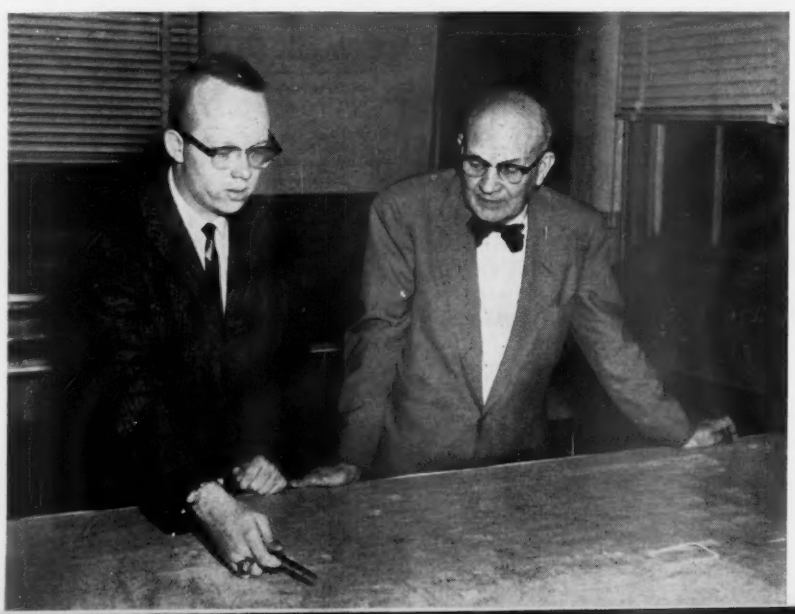
Following are the answers that were submitted to us.

WILLIAM C. ROCHELLE
Tau Beta Pi Fellow
California Institute of Technology

"My original reasons for choosing engineering as a profession probably developed during my years in high school when I found my most interesting subjects to be mathematics, chemistry and physics. I decided to major in engineering rather than in pure science in college because I was mainly interested in applying the economical and practical aspects of engineering to the basic principles developed from pure science; or, in other words, I felt that pure science should be a means to an end (the end being engineering, itself). However, I do believe my undergraduate curriculum should have included some more of the basic sciences, such as more advanced work in physics to serve as a stronger base for engineering development. I think if the engineer goes into graduate work he should take extra courses in physics and mathematics to supplement his more specialized engineering work and also to give him a more diversified field of study.

"My reasons for choosing engineering as a profession have changed somewhat since I began my academic work, and especially in the last three or four years with the coming of the space age. In high school chemistry fascinated me most of all and I wanted to become a chemical engineer. But after two years of chemical engineering, I began to see that the aerospace industry was going to play a vital role in our Nation's defense, so I switched my major over to aeronautical engineering. (This was about the same time that the first Sputnik was launched.) With the emergence of Russia as a fierce competitor in the race to outer space (both for military and peaceful purposes), I began to see the engineering profession as a profession extremely vital to our country's existence and a profession which had to grow in quality as well as in quantity if we were to maintain our position as world's leader in missile and space technology.

"It appears now that our position as world's leader is disputed with Russia, and if we are to forge ahead, we must develop more and better engineers than Russia. For this reason I believe the engineer of today should increase the level of his education to at least a master's degree and if time and circumstances permit, to the level of Ph.D. However, in graduate school I think the engineer should diversify his field of study somewhat. By this I mean that in addition to his major field of engineering study he should take courses in other branches of engineering and, if he is going to work



for a Ph.D., he should even go back into the areas of pure science such as chemistry and physics. Most important, by the time he finishes his course of study for his Ph.D., I think he should have had at least four or five semester courses in advanced engineering mathematics.

"One other subject I have found the engineer should study – if not in undergraduate school, certainly in graduate school (as I have done) is in the area of engineering economics or manufacturing management: this so he can link the pure science and engineering aspects directly to manufacturing and production methods.

"In my own case, I have felt that this diversification concept has been important to me as I first spent two years in chemical engineering, then three years in aeronautical engineering, and my first year in graduate school in mechanical engineering (with a jet propulsion option where chemistry is again important). If I go on further for a Ph. D. I would plan to take additional work in electrical engineering and electronics, although my actual major would be in aerospace engineering.

"Because of the coming of the Sputniks and Russia's rapid expansion in science and engineering, I believe the American public and American industry have become fully aware of the importance of the American engineer, and as a result the engineer of today should be able to obtain a much better job upon graduation. This fact is exemplified by noting that starting salaries are up about two-thirds over those of about ten years ago. Because it appears that the competition with Russia will become stiffer yet in the years to come, I think that the American engineer will be able to advance much farther today that he could say, ten years ago, once he begins his work as a full time professional engineer. I believe that engineering professionalism in America has been changed by Russian advances such as Sputnik, and that today the American engineer is certainly in a most advantageous position with greater opportunity than he has ever realized before."

Fellow Alan J. DeVilbiss (above) does his graduate work at the California Institute of Technology. Fellow Richard L. Francis (left in left photo) discusses some plans with a professor at Georgia Institute of Technology.

BRUCE G. NIMMO
Tau Beta Pi Fellow
University of Florida

"My original desire to become an engineer was based on a keen curiosity concerning the world around me and, in particular, the physical or natural sciences. Also, I had the feeling – and still do – that the engineer – as opposed to the more theoretical or abstract scientist – has the benefit of a closer contact with social needs and hence gains greater pleasure in the fulfillment of these needs.

"Since beginning college level work, but especially in the past year, I find my views on the engineering profession have become considerably enlarged. Association with engineering in a student capacity for five years naturally gives one a feeling of personal identification with the profession. In addition to this, however, and probably as a consequence of it, I now feel a responsibility to engineering to help project to society a true picture of what the profession consists, its capabilities, its potentialities and its philosophies. This responsibility is not only the projection of the above aspects, but in their actual application.

"The word 'philosophies' was not chosen at random, for I believe that the engineer who has a feeling of professionalism does indeed adopt concepts which I like to term an 'engineering philosophy' and which I feel are unique to the breed. This arises partly from the fact that the engineer is the junction point between the theoretician and the humanist. He is the interpreter in the language of science and therefore finds himself in a position of both great obligation and great opportunity.

"I don't think that the advent of the 'Sputniks' had any great influence on my outlook toward engineering. Great engineering advances have been an inherent part of the past quarter century and since I myself am a product of that period, the 'Sputniks' merely seem to fall into their proper places with other evidences of progress.

"I do feel, however, that the satellite launchings have tended to make the general public more aware of the importance and place of engineers in society. On the other hand, unfortunately, there are undoubtedly many who, because of emphasis on national defense, see the engineer as the 'triggerman' in the current world conflict. The over-all result of 'Sputnik' (referring to it more as a symbol of the recent technological spurt than as the actual satellite) would appear to be the bringing about of a realization of the necessity for programs which will keep our nation strong both militarily and economically. The engineer, being an integral part of both these facets, finds today better job opportunities and also greater opportunity to enhance engineering professionalism. Events such as Sputnik create an environment for change, but it is up to the individual engineer to see to it that such changes are for the better.

"The rapid increase in technology naturally raises a question as to the necessity of increasing the formal education of the engineer. Here we must obtain a balance between the desirability of extended education and the practicalities of finance, time, etc. The demand of our ever increasing store of technical knowledge is, of course, evidenced in the five-year undergrad-

uate programs now in existence. Engineering is such a broad field, however, that I don't think a universal increase in formal education would be as rewarding as a program which would assure the availability of further education to those sincerely desiring it. I could not leave this particular aspect of the subject without stating that I feel the four-year program offered at my alma mater, Clarkson College, was and is a fine example of the four-year period possibilities. In answer to one of the questions asked and as implied above, yes, I do feel my undergraduate program was well divided between the scientific and engineering disciplines.

"Of course, in general, any emphasis on science which overshadows and places engineering in the background, causes the latter to suffer. Here again it would seem that the extent of this overshadowing is inversely proportional to the effort which the individual engineer is willing to put into the professional development and growth of his chosen career."

RICHARD L. FRANCIS
Honeywell-Tau Beta Pi Fellow
Georgia Institute of Technology

"I was considering engineering as a profession at the age of fourteen. My enjoyment of mathematics and science courses caused me to lean in this direction, and I was encouraged to do so by several of my teachers and by a friend of the family who was an engineer. Also, I was attracted by the opportunities open to young engineers. My reasons for choosing engineering have not changed.

"It is obvious that America's growing space program has created many new openings for engineers; for example, Redstone Arsenal plans to hire approximately two hundred new engineers at the end of this school year. It seems evident that the increased demand for engineers in the field of space technology, assuming that the current recession is only temporary, can but help result in better initial utilization of new engineers; this to me implies a better job upon graduation and improved opportunities for advancement.

"As a result of Sputnik the fields of engineering and science have received a great deal of publicity, which I believe, on the whole, has been beneficial. Certainly it has resulted in a greater realization by the layman of the vital place of science in today's world. However, I do think it is unfortunate that the publicity has been only of space technology; this certainly presents an unbalanced picture of science and engineering.

"To me, it seems inevitable that more and more education will be necessary in engineering. As it stands today, engineering is one of the few professional fields which a man can enter with only a bachelor's degree.

"What a satisfactory undergraduate curriculum should consist of seems always to be a moot point. My own curriculum consisted primarily of basic science courses for the first two years. Speaking personally, I feel that this was sufficient. If my curriculum did have a failing, I think it was because it did not include enough liberal arts courses."

TIMOTHY R. SCHLAX
Tau Beta Pi Alumni Fellow
Marquette University

"I have always had an aptitude for mathematics and science and have been interested in science since about eighth grade. In high school I became especially interested in electronics when I started building and repairing radios as a hobby. Because of this great interest in electronics, I chose electrical engineering as a profession as opposed to physics which I had previously considered.

"Since I have begun my academic work, my electronic interests have continued to increase and I feel that the engineering career can offer me the opportunity and challenge I desire. During the last one and one-half years of my academic work, I have been doing research which borders between engineering and pure science. Between these two types of research I prefer the engineering research because there is a specified goal which is being strived for.

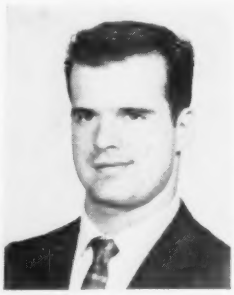
"Job opportunities have definitely increased since the Sputnik has been launched. The advent of the Sputnik has brought into existence many technological problems, which have to be solved by the engineers and scientists. These problems create more and better job opportunities for the graduate engineer and afford more avenues for advancement, thereby enabling one to advance faster if the individual proves himself worthy.

"Because of the increased technology there is a more abundant and a more complicated wealth of

(Continued on page 54)

1961 TAU BETA PI FELLOWS

William C. Rochelle
California Institute
of Technology
(right)



Bruce G. Nimmo
University of Florida
(far left)

Timothy R. Schlax
Marquette University
(near left)

FROM WASHINGTON

BY
MILTON F. LUNCH,
N.S.P.E.'s Legislative Counsel

The Party's Over ►

Congress has returned from its Easter recess (plus an extra day off to help launch the opening of the 1961 baseball season) and now enters the "grim" phase of legislative business. The honeymoon for the new Administration, if there was one at all, is over, and the traditional political infighting starts in earnest. Most of President Kennedy's 1961 program remains to be acted upon, although Administration spokesmen profess satisfaction with the rate of progress in the first phase.

The outlook for most of the Administration program in the public works area is favorable. In the main these proposals are not politically disputed and they bear most heavily upon a congressman's vital interests—the promotion of public projects in his district at a time when a great number of localities are still trying to make a full comeback from the low point of the recession. Administration economic spokesmen feel that the bottom has been reached in the economic downturn, but still hold that the public works program is vitally needed to push the upturn movement. The outlook in this area includes the following:

◄ Delay for Depressed Areas

Both bodies of Congress have passed bills to provide aid to depressed areas although in somewhat different form. There is little doubt, however, that the differences will be ironed out in conference and that the President will approve the final result. The measure will provide loans and some grants to help communities build plants and public facilities needed to service them. The latter aspect would cover such items as roads and water and sewer systems. The argument of conservatives in the House that the bill is potentially one of the greatest "boondoggles" and could turn into the biggest public works bill ever passed failed to sway the House as a more restricted version went down, 292 to 125.

Payscale Problems ►

The President is concerned about so-called "sidebar" corporations set up to provide engineering and scientific services to Government agencies and operating exclusively on Federal funds. There has recently been a flurry of interest in such operations, particularly with regard to the point that such private companies pay their staff personnel greatly in excess of salaries paid to Federally employed engineers and scientists doing the same or similar work. In effect, the Government is paying both groups, but at vastly different rates. In response to a question about this practice at a news conference, the President commented: "One of the problems, of course, is that valuable technicians are required to make a substantial economic sacrifice when they come with the Government. Therefore, the services, faced with this problem of where these men, who are essential, can secure much greater pay outside the Government than inside, had to resort to devices to which you refer, and we are looking at the matter." The President added that he was not prepared to express an opinion "which would deny the services of these valuable scientists."

A congressional inquiry into the practice appears to be in the offing. This will provide NSPE and other engineering and scientific

groups a further opportunity to press for a reformation of the civil service laws affecting engineers and scientists along the line of a separate schedule for such personnel, together with higher and more competitive salaries for direct Federal employment.

◄ Push for Pollution Projects

Secretary of Health, Education and Welfare Ribicoff is pushing legislation of the type vetoed last year by President Eisenhower to double the annual authorization for Federal aid to pollution control projects. The HEW Secretary told a House group that the present $50 million authorization should be raised to $100 million, but the bill before the Committee would go to $125 million. Ribicoff also favors raising the limit on the Federal share to $1 million for a single project in place of the present $250,000 limitation. He told the solons that water use has increased eightfold since 1900, and pollution from organic industrial wastes tenfold. The total flow of the Ohio River, for example, is used 3.7 times before it flows into the Mississippi, he said.

Meanwhile, a Senate committee estimates that Americans will have to spend approximately $12 billion in the next twenty years on water storage facilities, and $42 billion for waste collection and treatment. Senator Engle of California would raise the total estimate to $200 billion for the next two decades. The majority report proposed a five-point program stressing up-to-date inventories of needs in all of the Nation's major river basins, Federal grants to states for water resources planning, a coordinated Federal water research program, biennial Federal assessments of water resource needs in major regions, and better flood control and water storage plans.

School Aid Scuttle ►

The emergence of the religious issue has clouded and made uncertain the prospects of Federal action to provide funds for school design and construction this year. There is no indication, however, that the Administration will relax its efforts in this direction and the outcome may finally depend upon such outside influences as the recent launching by the Soviet Union of the first successfully manned flight into outer space. For the past ten years or so, rightly or wrongly, efforts to obtain Federal aid to education have had ups and downs in almost direct relationship to comparative U.S.-Russian accomplishments in scientific fields.

Legislative programs to provide college and universities more assistance in financing housing and academic facilities are in somewhat more favorable circumstances and the outlook is optimistic for action on both of these counts. In addition, the Administration has endorsed legislation to help the states create new two-year junior colleges.

◄ High Priced Highways

The interstate highway program is to be pushed virgorously. President Kennedy has asked for new taxes to keep the program on schedule and there will be a fight over financing methods. But Congress seems to be in general accord with the President's position of being "wholly opposed to either stretching out or cutting back" the program. The highway message to Congress states that the engineering and construction resources are readily available to absorb the step-up of the program. Among the telling points made by the President are that the interstate system now under way will save at least 4,000 lives a year, when completed, and that it will save the taxpayers some 42,000 years of travel time every year. The President also tied in the economic values by citing the impact upon such vital industries as steel, construction, cement and the stimulation of more modern and efficient industrial complexes. In addition to the prior release of $724 million for the program early in the year, the President said he is studying a suggestion from New York Governor Rockefeller that the states be given an advance from fiscal 1962 funds.

Making the Engineering Team CLICK

By
H. B. VAN DORN
Vice President in Charge of Engineering, The Fafnir Bearing Company

THE title of this article implies that the engineering group to be discussed is already in existence. This is the situation, I think, in which most of us are now working. We *have* a team, whether it has been assembled for accomplishing a specific task or for fulfilling a general function made up of a series of inter-related projects.

So the important question with which we must deal is: What makes a good engineering team—and what makes it click?

Facing the facts, then, efficient use of engineering manpower is first governed by the usual practical limitations—too few people, extensive goals and a limited budget of time and dollars. You haven't been able to assemble all top talent perhaps, but the people you have offer good potential as a team. Man for man the Pittsburgh Pirates may not have been champion material, but through teamwork they won a pennant and the World Series.

After the team is formed I am convinced that the greatest responsibility for success lies with engineering management, its direct policies, and its basic philosophies.

As for direct policies, it is easy to point to the classical ingredients that must be provided to reach any given objective. First, judicious selection of work areas must be made to insure that results will match the company requirements. Not only what areas, but the magnitude of the penetration into the chosen field must be decided.

Secondly, selecting the right men for the specific project so that their knowledge and temperaments blend to best advantage cannot be overemphasized.

Next, a thorough delineation of the target must be communicated to the team. The objectives and time budget must be clearly understood. Even then, knowing what to do is not enough. Adequate facilities and incentive must be added to get things underway.

Much has been written and said about incentives, be they spiritual, psychological or material. Someone said, "Money isn't everything but it's way ahead of whatever is in second place." On the other hand (so that we all will not begin to get fat and happy) Charles Kettering proposed that, "There is nothing quite so conducive to thought as the sheriff." However your company provides incentive, it is important.

A final ingredient in the formal pursuit of them efficiency by engineering management is the exercise of "feedback" control. Guidance of a project should not be so strict as to discourage creativeness on the part of team members, but on the other hand it should be in close enough communication to provide redirection and assistance when the ultimate objective is jeopardized by roadblocks or diversion. It is at these critical stages that management should be most alert to unexpected value in diversions and breakthroughs resulting from overcoming these "roadblocks."

So much for generalities. Now what are some of the practical contributions to efficiency of the team? Anytime is a good time to ask ourselves a few questions. Are we burdening our engineers with paperwork? Are they writing too many reports, doing clerical work? Are meetings or conferences monopolizing their time? Has consideration been given to the use of data processing machines, computers or calculators to save manhours? It it is good policy for team members to have an appreciation for sales, purchasing or production control problems, but are they contributing a disproportionate amount of

The importance of a company's supplying the proper facilities and incentive for effective work is shown as one Fafnir engineer enthusiastically tests a new piece of equipment.

their time in activities which someone outside the team should be doing?

Team performance can be augmented and improved by seeking and accepting outside assistance, either in the form of talent or facilities. In the educational field there is a vast reservoir of original study and research emanating from post graduate theses, R. & D. contracts, and specialized courses and symposiums under cooperative sponsorship. Members of the educational staff are ready and willing to take on projects or act as consultants in their fields. Many man-hours can be saved by guidance from people who are "in the know."

Then, too, it is by no means a remote possibility that the very task in which the engineer is currently engaged may have been duplicated in whole or part in other quarters where data and experience concerning it may be readily accessible. For instance, valuable references can be obtained from civic, university or professional society libraries. Data and suggestions are almost always offered by your vendors and customers since they have a stake in your success. Liaison on the engineering level with these good friends of your company can pay off if you maintain an open mind—a willingness to learn from others.

Finally, there are the side talents of the men themselves. Knowing a man's early experience or training, his hobby or his community activities, opens a pool of values useful to the engineering team if put to work. The scientific mind has many facets which can be brought to bear on technical problems. It pays to know your men, to explore their competence, knowledge and interests in considerable depths in order that you can utilize the whole person.

Thus far we have considered the engineering team and its efficient utilization as a going concern, manned, equipped, and ready for its task, but there is more. It is my belief that true efficiency demands that we obtain from the engineer not only his rated capability, but also his unrated potential as well. When the spark of promise and desire for professional growth becomes evident in our scientists, engineers or technicians, it behooves an organization to encourage and help the individual toward constructive activity. This is training in a sense, or education if you prefer. Opportunity for such development exist both outside and within the framework of their jobs.

College evening courses such as those provided by many universities are invaluable. Add to these the intra-company classes, organized training sessions, trade school offerings and opportunities for shops duty where the engineer can broaden his experience and knowledge of the company's operations. Participation in the activities of professional societies offers employees excellent opportunity to keep abreast of progress in their respective fields. For such activity and for schooling some financial assistance by the company can pay rich dividends in team efficiency.

Cross fertilization of ideas between the scientists, the engineer and the technician is one of the great broadening influences for each member of the team. Until the scientist has been given the engineering "facts of life" and the engineer made aware of the problems of industrial production, their training has not been complete.

Great difficulty is experienced today in reducing scientific discovery to "hardware" in reasonable lengths of time. Probably the greatest single force that can reduce this interim is improved communication between scientist, engineer and technician. I have seen a case in the missile industry where a huge new organization had spent millions of dollars on reliability only to be faced with a missile failure because the "longhairs" had failed to get or accept "the message" from the logical practical men down in the ranks.

A few years ago a whole plant producing guidance systems for a missile stopped production because the acceptance level at final test reached zero. Their problem was one that had been solved thirty years before in the electric motor business where the preventive cure was axiomatic with "old timers." Education is sometimes gained the hard way.

It is nevertheless true that the great teacher is experience. Opportunity must be offered and responsibility assigned to relatively unproven personnel who show promise. These chances for advancement through experience represent reward and incentive. They give a man challenge and variety which in themselves constitute stimuli for improved personal and team output.

Balance of the work load is important but more so is the fact that the team should be kept busy. Be ambitious for the team, provide what seems to be more work than they can do and set the goals high. They like it that way. Their morale and enthusiasm runs highest when they feel they are part of a "tight show."

In conclusion, there are some intangible factors that are of great importance. When a man has justified his company's confidence in his abilities and other attributes, and the company has in return recognized its obligations with reward, a mutual respect and trust results. This joint attitude of faith in the rights of the individual and in the American system reflects in top performance of both the man and his company. The record of

(Continued on page 52)

About the Author . . .

Mr. Van Dorn

Horace B. Van Dorn began his career with the Fafnir Bearing Company in 1937 upon graduation from M.I.T. as a sales engineer and has remained with them to attain his present position as vice president in charge of engineering. He has served Fafnir as assistant chief inspector, superintendent of the experimental division and technical development manager. Van Dorn is a member of ASME, the Society of Automotive Engineers and the American Ordnance Association. A resident of Maplewood, N. J., he has served on the City Disposal Commission, and is a corporator of the New Britain, Conn., General Hospital.

Professional Profiles

Recently named Houston's Outstanding Young Man of the Year, James A. Cummins, P.E., is shown here with a view of First City National Bank of Houston as it was being constructed. Cummins' firm served as structural engineers on the project.

It is not difficult to see why the Houston, Texas, Chamber of Commerce chose James A. Cummins, P.E., as their nominee for Houston's Outstanding Young Man for the year 1960. Even in Texas, where bigness is a tradition, the 32-year-old owner of the Robert J. Cummins Co. has collected achievements and honors at a rate that would be enviable for many men twice his age.

And if the Texas traditions weren't enough, engineering excellence seems to run in the Cummins family. Cummins' father, the late Robert J. Cummins, P.E., was the first Texan to be made an Honorary Member of the American Society of Civil Engineers, the highest award of that Society.

For himself, James Cummins is a director of the Houston Engineering and Scientific Society, a member of the Engineers' Council of Houston, the Texas Society of Professional Engineers, NSPE and the American Society of Civil Engineers. In ASCE, Cummins has been active since his student days, has been secretary of the local chapter for two terms, and has won the Daniel Meade paper contest at state level.

Cummins received his B.S. degree in civil engineering from Southern Methodist University, and followed it up with a B.B.A. degree in industrial engineering in 1949. After serving with the Army Corps of Engineers in Germany, he returned to Houston to join his father's firm, and rounded out his education with a master's degree in civil engineering from the University of Houston.

The firm Cummins heads works in the design and supervision of construction of industrial projects, marine terminal facilities, structural frames and foundations for architects, and other civil engineering projects. The firm handled structural design on what will be the tallest all-welded steel frame in the world—the 31-story First City National Bank building in Houston.

Cummins is equally active in civic affairs. He is a past deacon of the Central Presbyterian Church in Houston, and has been recently appointed by the Mayor of Houston to the Zoning Commission which is engaged in drafting the first zoning ordinance the city has ever had. Also, Cummins has been active in the annual United Givers Fund drive for several years.

Dollars and Oppo

Why Engineers Sl

WORLD BAN

PARADOX and banking are probably among the least likely pairs of terms that the average individual would associate. Yet any discussion of the World Bank in general and the way it works with the engineering profession necessarily begins with the statement of a series of paradoxes. For instance:

- The name of the World Bank is not the World Bank. Its proper name is the International Bank for Reconstruction and Development.
- Although it is run basically like a bank, the World Bank was not set up to be primarily a bank in the first place.
- And while the Bank is probably financing engineering projects of size and number that would place it among the largest users of engineering services in the world, it keeps only an extremely small engineering staff of its own, and rarely deals directly with engineers.

To set the record straight, the above paradoxes are more apparent than real, and the World Bank is, in fact, one of the most reasonable and influential organizations functioning on an international scale today. It is not only a major factor in developing full economic and industrial potential in the Free World, but it also represents one of the largest sources of engineering business currently in existence.

That the Bank answers to the name of "World Bank" is a matter of convenience. Even in Washington, where practically any combination of initials can be pronounced, IBRD is too much to contend with. When the Bank was originally set up, after the Bretton Woods Conference in 1944, its aim was not primarily to provide banking services to nations of the world. In the violently war-torn conditions that existed then, the job was to make funds available for rebuilding on the shattered foundations that were the remnants of so many nations.

Since then, the nature of the work that the Bank finances has changed considerably. Where the job started to rebuild ruins, it has become a task even more broad: That of developing the heretofore untapped resources in such areas of the world as Africa and South America; adding to the economic strength of those nations who have room to grow and need funding for the growth; and generally making the advantages of twentieth century technology available in whatever areas of the world it can benefit the people involved.

Finland, Austria, Italy, Algeria, Ethiopia, Mauritania, Kenya, Federation of Rhodesia and Nyasaland, India, Burma, The Philippines, Pakistan, Iran, Japan, Thailand, Mexico, Colombia, Chile, Peru. The scope of the Bank's operations is partially measured by the many countries which are borrowers. Another measure is the $5 billion equivalent amount of loans that has gone to various nations of the world.

While the "Reconstruction" part of the title was perhaps most im-

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portant when the Bank opened its doors, the "Development" phase of its operations is now predominate in the Bank's affairs. From an engineering standpoint, the significance of the above statement is that engineering services are needed on the Bank's projects at a rate that is growing, at a rate spurred on by the needs of newly independent nations in areas of the world which have simply never tapped their industrial and economic potential. While the reconstruction job in the wake of World War II was immense, it was at least mitigated by the readily available engineering talent then existing in Western Europe, the hardest hit area. Further, much of the engineering work that would have been needed had the start been from scratch had been done previously, providing valuable experience, along with a full understanding of needs that might be encountered.

The many technical surveys conducted in Western Europe were able to save at least the beginnings of a fresh start. The teams running these surveys found remnants of industry and among these were certain items that could be saved. Among the most important were the people who could provide immediate, on-hand technical competence. But with the Bank's present field of operations, a technical survey team is indeed fortunate if it can find anything even approaching a technical foundation on which to build. By even a definition of the work, the reason for this is apparent. In providing funds for development of an undeveloped area, the obvious implication is that what must be developed does not exist.

AN example will make this point clear. In Ghana, there is a project forthcoming which may be financed in part by the World Bank along with the British and U.S. Governments. Ghana, as one of the newly emerged republics in Africa, has virtually no background

One of three Bank loans totaling $122 million made to the Federation of Rhodesia and Nyasaland is being used to develop the Kariba Dam and power stations (far left) across the Zambesi River. River barges, Thailand's principal transport, (left) are shown at the port of Bangkok near the large Bank-financed Chainat irrigation barrage on the Chao Phya river. The upper right photo shows pipe sections arriving by cable at a high mountain dam in the Reisseck-Kreuzeck hydroelectric project in southern Austria, which involves damming six mountain lakes with concrete blocks made in the valleys below. Work is near completion on the largest dam (center right). Engineers in Rangoon (lower right) survey the site of a transit shed which will be part of a $14 million project to rebuild Burma's transport system from World War II rubble.

This high arch dam across the Mulargaria River in Italy (right) creates a large reservoir for an irrigation project which has offered new prospects for agriculture in a formerly arid and poverty-stricken area of southern Italy. 1958 brought completion to a steel and concrete bridge over the Las Vacas River (below) in Guatemala. The bridge marks the beginning of the 200 mile Atlantic Highway which provides Guatemala City's first road link with the Caribbean.

in either industry or industrial development. Yet it is among the richest nations in the world for bauxite—raw ore for aluminum production. Ghana's bauxite resources are untapped, in the most literal sense of the word. Perhaps the basic reason is that the nation simply has not had the power resources necessary to mine or process the ore. Currently, Ghana is planning to do something about this, partly through the auspices of the World Bank. Working in cooperation with a group of American and British industries, led by Kaiser Industries here in the United States, Ghana has submitted to the Bank a request for a loan which will accomplish two things: First, it will directly involve a dam-building project to provide the power for aluminum mining and smelting. Second, it will secure the way for investment of private capital needed to build the smelting plants to carry the process through to its finish and put Ghana into an active position in the world aluminum market. Obviously, a project of this size is going to have a number of other effects. It will unquestionably change completely the face of the Ghanaian economy; it will provide enough power to bring electricity into the lives of many families in Ghana who may not even have heard of it before; and it will certainly do much to make Ghana a more advanced and stable political factor, both in Africa and throughout the world. One measure of this last factor: If the Communist bloc were to move into Ghana and develop the available aluminum, and were then able to market it at their own price, they could practically dictate the world aluminum market. As the world's largest exporter of aluminum, it is patently clear that the United States has something of a heavy stake in Ghana.

Such is the plan, but planning and doing are two entirely different parts of a problem. Perhaps the lack of Ghanaian engineering talent is best measured by the fact that until now they have never done anything about developing their aluminum resources. Hence Kaiser Industries, with their reserve of engineering talent, stepped into the picture. Getting together with Ghana, Kaiser Industries said, in effect, "You have the bauxite; we have the engineering talent; the World Bank has a portion of the money for a dam; we all have interest in developing an aluminum industry in Ghana; so let's get together on it." At this writing, that is just about what has happened. Although final papers have not yet been signed on the dam project, there appears to be every likelihood that they will be within a matter of weeks.

Ghana is only one example that could be drawn. Airports, shipping ports, roads, railways, waterways, irrigation and farm mechanization are among the many other types of projects which the World Bank actively finances. For every project named there is one point of similarity—the need for engineers. It is for this reason that the World Bank is one of the world's largest financers of engineering skills. The question that necessarily comes to mind for the practicing engineer is a simple one: With all of this business available, how do you put yourself in a position to do the work?

To slip in one more paradox, the best way to get World Bank engineering business is not to go to the World Bank. To the contrary, a World Bank engineer has sound advice on this point: "Get out and beat the bushes." There is a definite and obvious reason for this. In projects that are funded to the tune of hundreds of millions of dollars, it would be slightly haphazard to make loans available until exact specifications are drawn

up, checked, double checked and approved. To draw up such detailed plans, engineers are needed. Thus, the engineering firm that wants to participate in such a program must be in on the ground floor, or at least well ahead of the entrance of the World Bank.

WITHOUT realizing the situation, engineering firms will write to the Bank from time to time asking that they be considered for various projects. The standard letter that is returned to them by the Bank is perhaps the best statement of the Bank's position:

"The Bank does not select consulting engineers or other types of technical firms for the projects on which loans are made, but relies on its borrowers to arrange this service. However, the Bank requires that the firm appointed by the borrower shall have had satisfactory experience on comparable projects; that the staff to be assigned to the particular work is qualified and adequate, and that the terms of reference under which they are employed are such as to assure the satisfactory execution of the project. Therefore, we would like to obtain information not only on the work that has been undertaken by your firm, but also on the professional experience and technical background of the principal members of your staff. . . ."

Accompanying the letter is a questionnaire for the inquiring firm to complete which attempts to establish the above-mentioned qualifications. The four-page form lists just about every conceivable branch of engineering and leaves ample space for the engineering firm in question to "please submit a list of some of your recent projects, the various countries in which you have been, or are working, and any literature or brochures that would be of help to us." It is fairly safe to say that this is the most important part of the questionnaire. The reason: Under the general category of "Navigation, Ports and Coastal Works," there is the following breakdown: (1) Docks, Harbors and Jetties; (2) Dredging, River and Coastal Training Works; (3) Navigation Locks and Dams; and (4) Traffic Studies. While a given engineering firm might specialize in the general category, it would probably be a safe bet that they concentrated on one of the three more specific phases of the work. A list of recent projects would most certainly show this to be the case.

If you do not get World Bank business at the World Bank, where do you go? Following the example of Kaiser, you go to the nation that will be getting the loan. The Bank has 68 member nations, ranging in size from that of the United States to that of El Salvador. Members of the Bank's staff recommend the embassies of the member nations in this country, or better yet, the home based governments of the nations. When a World Bank engineer said, "Beat the bushes," these were the bushes he had in mind. But plainly, maintaining contacts with some 68 nations is a job bordering on the impossible. Is there no way of narrowing the field? There are, as a matter of fact, several ways. The first is common sense. A good number of the Bank's member nations simply are not likely to be applying for loans in the near future — the United States and Britain are obvious examples. The second is geographical consideration, which could well rule out those nations too far away or too remote for many firms to consider.

Third, there is the type of work that a given country must have done. Elementary logic dictates the conclusion that land-locked Paraguay is not likely to need much in the way of port construction. To carry this criterion a bit further, it is clear that the engineering firm knowing which of a given nation's engineering needs might be financed by the Bank has a firm basis from which to pursue the job

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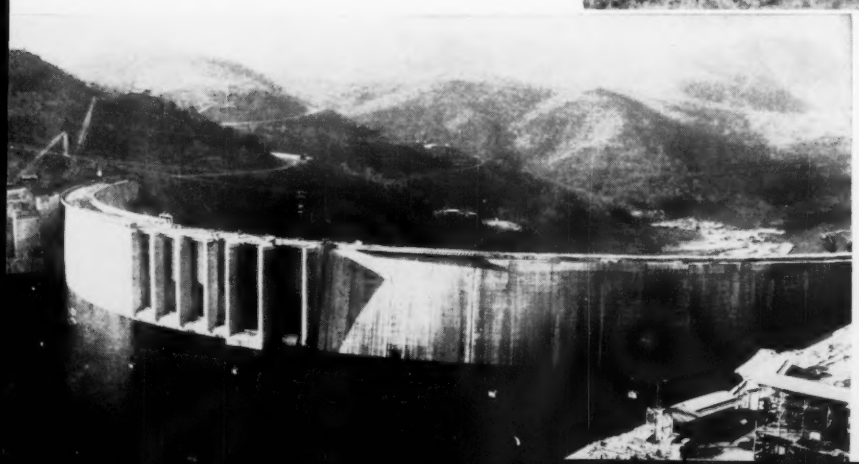

A huge ball-and-chain apparatus (above) was dragged across acres of the dense Kariba valley jungle area in Rhodesia before construction of the Kariba Dam (left) on Zambesi river in central Africa. The dam supplies power to the copper industry in Northern Rhodesia and provides the steady flow of water needed for agriculture in the valley.

Report on a Case by the Board of Ethical Review

The Board of Ethical Review was established to provide service to the membership of the NSPE by rendering impartial opinions pertaining to the interpretation of adopted Canons of Ethics and Statements of Policy regarding professional conduct. The *American Engineer* will print findings on specific cases as they are reported by the BER to the NSPE Board of Directors.

Case No. 60-5

Subject:

Conflict of Interest—Section 4, Canons of Ethics; Section 9, Canons of Ethics; Rule 9, Rules of Professional Conduct.

Facts:

A state sanitary engineer works with communities in promoting adequate sewage and sanitary installations. Some small local communities become interested in the program and desire to construct appropriate facilities. These communities ask the state sanitary engineer for a list of qualified consulting engineers to handle such work. The plans prepared by the consultants will require approval by the state sanitary engineer or his office.

Questions:

1. Should the state sanitary engineer submit a list of qualified consulting engineers?
2. If the answer to question 1 is "yes," should he restrict the list to those firms known personally to him and which he believes to be qualified?

References:

Canons of Ethics—Section 4—"He will have due regard for the safety of life and health of public and employees who may be affected by the work for which he is responsible."

Section 9—"He will act with fairness and justice between his client or employer and the contractor when dealing with contracts."

Rules of Professional Conduct—Rule 9—"He will regard his duty to the public welfare as paramount."

Discussion:

Although neither the Canons nor the Rules refer specifically to a "conflict of interest," it is axiomatic that a professional person may not take action or make decisions which would divide his loyalties or interests from those of his employer or client.

It is arguable that this would not be the result of a state sanitary engineer endorsing as "qualified" a firm whose plans he would later be called upon to review and approve. However, it is equally arguable that the position of the state sanitary engineer would be compromised to some extent by such action, even though he would have the legal right to reject the plans submitted to him. In balancing these possible contentions we believe it would be more prudent for the state sanitary engineer to avoid placing himself in a situation which might even raise the question of a "conflict of interest," or any inference that the extent of his criticism of the plans was in any way limited by the fact of his prior endorsement of the firm as qualified. He should be in completely independent position in reviewing the plans submitted.

A state or local professional engineering society could appropriately provide information regarding qualified firms as it would have no direct or indirect interest in the matter, nor would it be placed in a compromising position in doing so by virtue of later having to pass on plans submitted for a firm on the list, or one selected which was not on the list. Moreover, professional engineering societies invariably have as one of their stated objectives assistance to the public and state and local governments in securing qualified professional engineers for engineering assignments affecting the public health, safety and welfare.

Conclusion:

Question 1 is answered negatively, which also disposes of questions 2 and 3. Further as to question 3, the state sanitary engineer must eliminate as completely as human nature permits any consideration of personal feeling as to the firm whose plans he is required to review, and he must base his review solely on the technical soundness of the material presented to him.

Board of Ethical Review
L. R. Durkee, P. E.
Wylie W. Gillespie, P. E.
A. C. Kirkwood, P. E.
Ezra K. Nicholson, P. E.
Pierce G. Ellis, P. E., Chairman

Dissenting Opinion:

In connection with question 1, we believe a state sanitary engineer, upon request by community officials could submit a list of qualified consulting engineers. It should be made clear, either in the conversation or in the letter of transmittal, that the state sanitary engineer is, of course, assuming no responsibility for either the selection or the work of the consulting firm. It would also be highly desirable to indicate both in the conversation and in the letter of transmittal that he would recommend that the community officials consult several of these firms and make their own selection on the basis of the concern that they judge would give them the best service. The sanitary engineer should also indicate that there are other qualified engineering firms not indicated on his list.

We have a strong feeling that the community has a right to expect this kind of service of an engineer employed by the state and it is most likely that a state sanitary engineer with the broad coverage he would necessarily have

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For The Inventive Engineer:

The Essentials of Patent Law

A B C's

By
ROBERT G. MURDICK, P.E.
General Electric Company

THIS is the age of invention! The Patent Office in Washington, D. C., is issuing new patents at the rate of one thousand a week. Any one of these patents may alter the entire future of your company, either for better or for worse. Today, successful companies strive constantly to maintain a good patent position in their own field.

What does a good patent position depend on? It depends directly on each engineer's knowledge and application of basic patent principles. The engineer who works without such knowledge jeopardizes his company's investment in his work.

The engineer, by careful attention to patent aspects, is in a position to prevent exposing his company to heavy damages from infringement suits. In addition, each patent that an engineer obtains on a really useful invention improves the prestige and cross-licensing position of his company.

From this it is apparent that active participation in patent affairs is an important part of the engineer's job. While it isn't necessary that he take a course in patent law, it is necessary that he have a clear conception of these basic subjects:

- Nature of invention.
- Good records.
- Corroborating witnesses.
- Public use (statutory bar).
- Diligence.
- Infringement studies.

Nature of Invention

In order to understand current patent practice, the engineer must first have an understanding of the nature of invention. In a broad sense, invention is a new display of ingenuity that is beyond the scope of the routine worker. Legally, it consists of two parts—conception and reduction to practice.

Conception is the first *mental image* of the invention. Reduction to practice, on the other hand, means that the device must be built and actually working. A case that illustrates the meaning and importance of reduction to practice came before the Court of Appeals of Washington, D. C. The voting machine, which was the subject of the dispute, was found to be liable to failure once in a hundred operations. The Court held that this was worse than no voting machine at all and therefore reduction to practice had not been accomplished. Since a voting machine which makes *any* errors is not "useful," as required by patent laws, the inventor could not obtain a patent.

This careful summary of the nature of invention has been given by the famous jurist John Haynes: "Patentable invention is a mental concept of a new and useful result inclusive of the mode of its physical attainment, characterized by an idea or ideas that are new, original, and creative and add to the sum of knowledge of the art to which the concept pertains."

Importance and Nature of Good Records

Case after case of patent litigation has been lost because of poor records. In order for the inventor to establish the date of conception of an invention, he should have a clear written description of his work properly corroborated by at least one witness other than a co-inventor. In one court case, a witness had signed his name at the bottom of each page of a record book as witnessing and understanding the work. However, his name appeared at the bottom of a blank page. The case was lost because of this one indiscretion. The well trained engineer should know what constitutes a valid record and maintain his own records carefully.

Corroborating Witnesses

Like well kept records, corroborating witnesses are very important in establishing the facts in patent interferences. Who does and who does not qualify as a corroborating witness is now well defined by the courts. A very important ruling occurred in connection with a research worker for the Jello Company who had been conducting a series of laboratory experiments. At regular intervals this employee sent detailed reports of his work to his supervisor. Later the supervisor was called upon in court to help establish the date of conception of a resulting chemical process. The court ruled that since the supervisor had not actually observed the tests, he did not qualify as a corroborating witness. As a result the Jello Company lost the case.

Public Use or the Statutory Bar

Many patents have been lost because they were not applied for within the time limit of one year after public use. What constitutes "public use" is often difficult to determine, and the engineer should consult his company's patent department when in doubt. Two extreme cases will illustrate this.

In the Elizabeth vs. Pavement Co. case, the inventor constructed a pavement which was used by the public for a number of years before a patent application was filed. It was ruled that this did not constitute public use but was merely a test to determine the value of the invention.

On the other hand, one corset inventer sued another for infring-

ing his corset patent. The infringer won the case on the grounds that the inventor had given such a corset to his lady friend several years prior to filing an application. The court ruled that this constituted such "public" use as would invalidate the patent. A conservative "rule of thumb" is that any "nonexperimental" use of the invention is a "public use," or the eye of the Patent Law.

Diligence

Diligence, in the legal sense, is an important concept with which the engineer should be familiar. Diligence consists of reasonable effort directed toward embodiment of an invention in physical form or toward filing an application for a patent. The importance of diligence in securing a patent can be seen from these two extreme cases.

In the case of Joy vs. Morgan, Joy first conceived of a coal loading machine which was not reduced to practice and a patent applied for until *seven years* after Morgan applied for a patent. Joy presented this interesting story to the court. He had been a poor boy who went to work in the coal mines at the age of twelve. At 15 he took a correspondence course in mechanical engineering. In 1903 when he was 19, he conceived a crude form of coal loading machine which was workable but not sufficiently developed to be classed as a practical machine. He devoted his earnings through the years to building models and making drawings. Joy tried unsuccessfully to interest mine officials in his machine. Finally in 1915, he and a friend constructed another model that appeared practical. In order to seek financial aid he resigned his job as superintendent. At this time he contacted the chief engineer of the Pittsburgh Coal Co. who saw that the machine was just what they were looking for. Joy was authorized to build a machine. This was completed in 1916 at a cost $20,000. The machine was so successful that several more were ordered and Joy finally filed an application for a patent.

The court held that, although Morgan filed his application first, as soon as he had the first crude idea, Joy had been the first to complete the inventory. Joy's persistent efforts showed that he had done everything possible to develop his invention continually from the time of conception. In fact it was considered commendable not to file on the first crude idea. The decision was that Joy should have the patent.

A contrasting case was that of Grundy vs. Van Leir. Van Leir, a salesman, first conceived of a certain flexible coupling. However, Van Leir traveled a lot, and he let the development of the coupling remain dormant. When both he and Grundy applied for a patent, the case went to court. Van Leir was unable to prove diligence during a *six day* period after Grundy had entered the field. As a result, Grundy obtained the patent although Van Leir had been the first to conceive.

The maxim of equity jurisprudence which refers to diligence in invention could well be applied to the whole subject of the engineer and patent law. "Equity aids the vigilant, not those who slumber on their rights."

Infringement Studies

Knowledge of the services of his employee's patent department is as important to the engineer as knowledge of patent principles. When a new development is nearing the production stage, review of the design from a patent standpoint should be secured. The patent attorney checks to insure that the contemplated design does not incorporate inventions to which the company has no rights. It can easily prove costly to mass produce a new product later found to incorporate someone else's patented invention.

From these illustrations, the importance of "patent consciousness" is clearly evident. Patent protection must originate with the engineer. The engineer must have a reasonable acquaintance with basic patent principles and with his employer's patent procedures in order to fulfill his job responsibilities to himself and his company.—**End**

About the Author . . .

Mr. Murdick

R. G. Murdick P.E., was graduated from Duke University and received his M.S. in management from R.P.I. He continued advanced study at the U. of Maryland. Union College, and the U. of Florida where he is currently on a doctoral fellowship. During his 14 years with the General Electric Company in development engineering and engineering administration, Murdick served as patent coordinator for the Aeronautics & Ordnance Systems Division for three years. He is a registered professional engineer (N.Y.) and is active in the Society for Advancement of Management.

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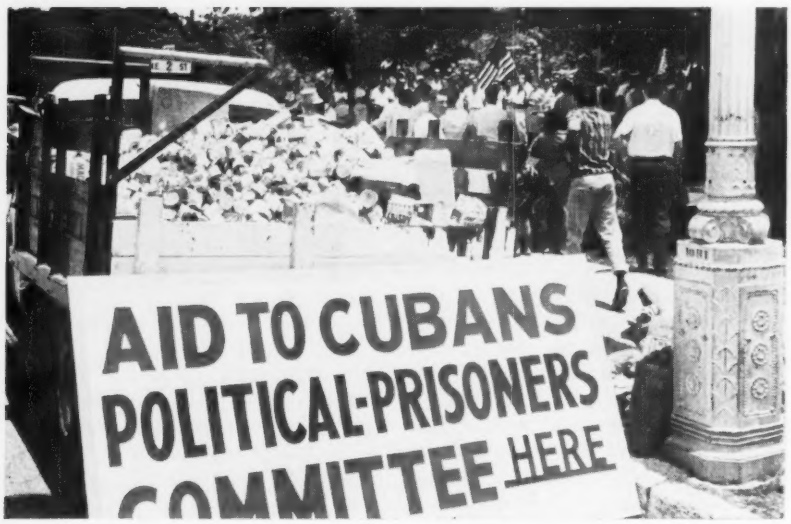
Depreciation and the Engineer—A Missed Opportunity?—September, 1960
By Maurice E. Peloubet, C.P.A.
Pogson, Peloubet & Co.
New York, N.Y.

How Revolution Affects Engineers

With the failure of the recent attempt to overthrow Castro, it's clear that conditions in Cuba will worsen before they get better. Hard-hit in the past have been the professional classes, and there are more hard times for them in the future.



Food shown here was collected from Miami residents to aid those who were being detained in Cuban prisons.

Bishop Carroll is shown here working with one of a number of Catholic charities which have begun programs to help Cuban refugee children.

ABOUT the only sure thing that can be said regarding Cuba is that it's south of the United States. This, and the climate, are just about the only things that Castroism isn't likely to change.

But aside from these facts, Cuba offers the world what is perhaps one of the most unstable political faces that there could be—an internal government that can only be described as haphazard, and external relations with other countries that range from the umbilical to the nonexistent. In examining almost any part of the Cuban situation, the inevitable conclusion is that something must change. It simply can't continue the way it is.

In the meantime, Cuba is something less than the ideal place to live, as witnessed by the tens of thousands of refugees who have fled that Communist dominated nation.

Among the hardest hit have been the professional classes—doctors, lawyers and engineers. This is true for a number of reasons. Many professionals in Cuba, realizing what Castro was doing to the country earlier than others, either opposed him or left the country. Not easily impressed by the propaganda that has swayed so many Cubans, the professionals often found themselves labelled politically unreliable and were no longer able to hold responsible jobs. With the heavy movement to nationalization, again the professionals were hurt.

It is undeniable that the new regime that came to power in Cuba in January, 1959, had the support of practically all of Cuba.

50,000 Cuban Refugees in Miami

A favorite place for rallying Cubans in Miami is in front of a statue of Jose Marti in Bayfront Park.

Very early, in February, 1959, anyone with common sense and an interest in public life could have seen the first signs of injustice—and that the communists and pro-communists were moving in. In April, 1959, these facts were easily noticeable to anyone, and by July of the same year it was so evident that the President of the Republic, Dr. Manuel Urrutia, was deposed and taken to prison because he publicly denounced on a television program the communist infiltration in the government.

All the large Cuban contracting engineering firms were intervened in January, 1959, and their assets totally confiscated. Salaries of their engineers as well as of the other employees were capriciously reduced just because they were too high. Inexperienced and recently graduated engineers were appointed to take over the jobs of the chief engineers. As a result, jobs scheduled to be finished by March and April, 1959, were not completed by August, 1960. In some of the companies where unit cost analyses were kept, they showed that in many instances unit costs with the government intervention were considerably higher than the "scandalous" unit prices the companies were supposed to have had with the former government.

New contracting companies were created after January, 1959, to bid on new jobs planned by the new government. The former Ministry of Public Works did not use the public bid system and as a logical result prices were criticized as excessively high. The new companies worked for about a year or a little over a year. Since several months ago they have disappeared, either confiscated or bankrupt.

Private engineering and consulting engineering firms are things of the past. The only chance to survive as an engineer in Cuba today is with the government. In November, 1960, all government professionals were requested to sign an official document in which and under oath the person stated he would be faithful to the present government and its policies. Besides, one must attend, as part of his duties, all rallies and demonstrations called for by the government. Most recently it is requested during weekends that one serve as a voluntary sugar cane cutter. This means eight to ten hours Saturday and Sunday cutting sugar cane with a machete. No pay is received for this task.

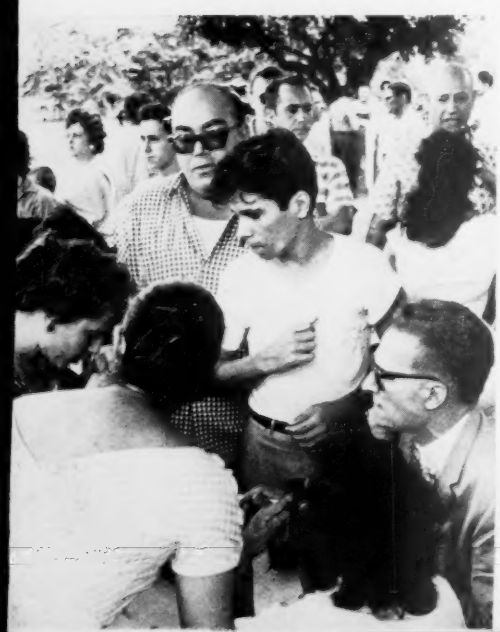
The above paragraph is neither joke nor overstatement. It is cold fact that this has happened 90 miles south of Flordia to all Cuban government employees, regardless of profession or age, in an alleged free country.

High bracket salaries have been eliminated and substituted with the minimum salary of about 4000 to 5000 pesos a year, the only difference being that the unofficial money exchange rate is presently four to eight pesos for one U.S. dollar, instead of the one to one rate of only two years ago.

In a nation where only 1.2 per cent of the population has a college education, it seems indeed strange that those with the educations are being so shoddily treated. Of the approximately 80,000 people who have higher educations, a sizable percentage have either been barred from responsible positions or have left the country. For instance, of the refugees coming to this country, the number of "professionals" in one month was up to 43 per cent, according to an official from the Cuban Refugee Emergency Center that has been set up in Miami.

These people are being replaced by loyal Fidelistas, political convictions rather obviously replacing the usual qualifications of training, skill and experience. It is perhaps at least partially because of the way Cuba has treated her own professionals that she now finds it necessary to import technical talent from the European Communist countries. However, even this may not be enough to fill the gap. United Press International has reported that a number of these technicians have found the bearded Castroites so difficult to work with that they have gone home in a state of disgusted frustation. Commented one Czechoslovakian as he left, "We couldn't stand such disorganization."

There is another aspect to the problem of Castro's treatment of



Cubans in Miami are always trying to get together on their various ideals and unite in one great effort to dislodge Castro.

Impromptu demonstrations are frequent in Miami, but as in this case there are few arrests—just a request not to tie up traffic.

The zeal of these fervently rallying Cubans makes evident their hope that democracy will triumph over communism in their homeland.

Cuban professionals—the refugee problem that has been put on the doorstep of the United States. There are an estimated 50,000 persons in the Miami, Fla., area who have fled from Cuba. Many—perhaps a third of these—are professionals. In many cases they are virtually penniless, and those who are unable to pursue their professions far outnumber the ones who are.

THE United States has a deep tradition of open doors and ready assistance for those who are fleeing oppression, but the men and women who have come to this country from Cuba offer a slightly different problem to those who are experienced in handling refugees. In the first place, the people who fled from East to West Germany to escape the tyranny of the Nazis in World War II, or from Hungary to escape Communism, came to the United States after they had been processed, categorized and put in travelling condition in the European nations to which they had originally fled. This provided the U. S. with a breathing spell in which to get ready for the refugees when they came. Also, it enabled the U. S. to know in advance what skills the people possessed, how many of them there would be, and what would be needed to adequately care for them upon arrival.

Not so with the Cubans. The people who have fled Cuba are coming directly to the United States with no advance warning or preparation. They are coming by planes and boats directly to the U. S., often having only the clothes on their backs.

Another difference is the attitude of the refugees themselves. When a European refugee comes to the United States it is almost invariably a permanent arrangement, and the refugee realizes this. His interests are in finding a job, a home and settling down.

Not so with the Cubans. Generally speaking, they don't really regard themselves as refugees. They are simply waiting for the political storm to blow over so they can return to Cuba and pick up where they left off. Among other things this means that there is reluctance on the part of the Cubans to leave Miami. Since they feel their sojourn in the U. S. will be short, they see no point in making permanent arrangements for their stay.

Consequently there results a problem for the United States. In terms of size it probably is not a major problem, but in terms of people, in terms of wasted skills, in terms of human hardship, it is definitely a problem that deserves a priority solution.

FORTUNATELY, a solution appears to be well on the way to completion. Initial processing is being handled by an office under the Department of Health, Education and Welfare, the Cuban Emergency Refugee Center. Located in Miami, it is well down the road of sorting out the refugees and is now beginning to work more on relocating them, to take the load off Miami. It is being helped by two factors.

First, since the Cuban government is no longer allowing people to leave the country on visitors' visas, the flow of Cubans to this country has dropped off rather drastically. Also, the airlines have stopped flying regular flights to and from Cuba, so there remains only the option of taking a boat across the 90-mile stretch of water from Cuba to Key West.

The second major factor helping to make the job more manageable is the large Spanish-speaking population in Miami. These people have been able to provide immediate shelter for the refugees, avoiding the need for building or making available barracks-type housing.

Yet all of this only comprises a first step. What remains is to find ways to use the skills available among the refugees. This serves the dual purposes of allowing the refugees to provide for themselves and giving the U. S. the benefit of the experience and knowledge on tap among them. The job is not an easy one.

Cuban lawyers, for instance, are trained under the continental system of law as opposed to the English Common Law system used in this country. For them to practice law in this country they would virtually have to start their education all over again.

Luckily, some work is being done on this phase of the problem. Specifically, University of Miami has set up a short course for doc-

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AMERICAN ENGINEER presents the final articles in a series presenting the many activities and responsibilities of . . .

NSPE'S VICE PRESIDENTS

Vice President Thomas Mann, P. E., Reports on the

ORGANIZATIONAL FUNCTIONS GROUP

THE Committees under the Organizational Functions Group are charged with the administrative responsibility of making the organization continue to function. In my opinion it is organizational maintenance. Sometime in your engineering career you have been, or will be, assigned the duties of maintenance engineer. If you have served your hitch you are familiar with the only available remuneration while in this capacity—self satisfaction. Every business, industry or product producing endeavor must have a base from which to operate, facilities with which to produce, and means of making the product available to the consumer. The product you deliver to the consumer must be the best for the purpose intended, or you do not stay in business over a long period of time.

The maintenance engineer's specific duty in this organization is to keep the base of operation and the facility for producing the product functioning to the highest degree possible. The operational procedure is clearly defined and the funds expended must be justifiable. He must keep abreast of the demand, anticipate trends and satisfy management. To accomplish this through a limited number of conferences with your co-workers, suggestions and instructions carried on principally by nation-wide correspondence under the watchful eye of 56,000 owners and their wives, with volunteer help, is a challenge worthy of only the unconquerables.

The Headquarters Housing Committee is not a full time or standing committee, however, they must function periodically to keep us housed. The committee recently reported that we have ample housing facilities for the foreseeable future. It is mandatory, however, that this committee review the situation in a couple of years as NSPE is a rapidly growing and ever expanding organization.

The owners must be kept informed of the activities of their organization. The practical method of doing this is through the monthly publication of the AMERICAN ENGINEER. The sole purpose of the AMERICAN ENGINEER is to keep you, the owner, informed as to what is going on within your organization, what might be of interest to you to keep your organization going, and current events of such a nature that will permit you to guide your organization to meet the demands of the future. The publishing of this periodical, is of necessity, not a very lucrative venture. The products and services listed in the AMERICAN ENGINEER must be limited to those that can be of assistance to you in producing the product of NSPE. It is your magazine and what is published in it is your responsibility—since you own it. The American Engineer Committee will continue to administer the publication under your direction. Read your AMERICAN ENGINEER and you will know your organization, NSPE.

Every man likes to discuss his job. Engineers are not to be excluded. You are proud of your work or you would not be in it. We are all engineers and have that in common, but we need and demand a

(Continued on page 49)

Vice President Mann is shown here with NSPE President Noah E. Hull (left) and T. Carr Forrest (right) of the Texas Society at TSPE's recent annual meeting in Abilene.

Vice President W. Earl Christian, P. E., Reports on the

POLICY OPERATIONS GROUP

REFERENCE to the Policy Operations Group is intended to point to a certain group of committees set forth in the Bylaws, as the responsibility of one of the six vice presidents of the National Society of Professional Engineers.

The Bylaws define these committees as those "having to do with the coordination of policy development and application," and those concerned with "the carrying on of business operations." These definitions seem to cover, substantially, the activities of this group of committees.

To any interested observer it must surely be a real satisfaction to note, year after year, that each committee chairman and generally, each committee member, quickly acquires the viewpoint that his particular committee and its functions are of prime import and major concern to the Society. This kind of enthusiasm filters through to the officers, so that each of them places a high priority upon his respective group of committees.

At least the vice presidents share the concern for their committees along with the chairmen. It can be truly said that the same sentiment prevails in state society and chapter committees, especially when such committees have specific functions to perform or definite assignments to carry out.

This kind of spirit is, of course, most commendable. Obviously, it is encouraged in all segments of the Society, for it generates meaningful, constructive results.

Nearly two hundred members will serve on this year's NSPE committees. Add to this the officers of the fifty-three member state societies, and the active committees of each, with the officers and committee members of more than four hundred chapters, and you must surely arrive at a very impressive total. This is an indication of the large percentage of member participation in Society activities and programs. Each is important to the success of the whole effort.

This is a basic element of the organization pattern of NSPE. Such wide spread participation must surely be largely responsible for the growth and success of the Society within all segments.

Every member not now participating actively in local chapter or state society affairs is cordially urged to make his availability known to his Society officers. They will most certainly find for him an interesting assignment. Each such member will thereby experience a truly great satisfaction in serving his profession.

The Policy Operations Group differs in one major respect from all the other groups of committees. It has no creative function. It does not initiate new professional programs. Yet it is probably true that more proposals and programs are referred to these committees for implementation in one way or another than to any other group. It would, in fact, be accurate to supplement the definition of the functions of the these committees with the designation of "Society Service Group."

Let us look briefly at each of these committees, in alphabetical order, in support of the premise that this particular group has the primary function of providing the ways and means for the implementation of the activities of most other committees.

The Budget Committee: This committee must, of course, undertake to prepare a budget that will allocate the anticipated income of the Society equitably to all areas of activities. It seems to be inevitable that budget requests always exceed the expected income. In these circumstances it becomes the responsibility of the Committee to determine which areas of Society programs can withstand reduction without impairing or retarding the progress of all important programs. This requires an awareness of each committee's activities and goals, and some ability to assess, on a

(Continued on page 50)

Vice President Christian is shown here with Executive Director Paul H. Robbins as he reports to the recent Board meeting in Des Moines.

New Literature

FASTENER HANDBOOK – Ramset Fastening System has received an "Exceptional Merit" award from the National Association of Home Builders for its "Power-Driven Fastener Handbook for Architects and Engineers." The 48-page manual is the result of two years of research with architects and engineers. It contains work load tables and information and illustrations covering applications of power-driven fasteners in the construction field. Ramset power-actuated fastening tools enable craftsmen, by a simple pull of the tool's trigger, to secure studs and threaded fasteners instantaneously into concrete or as much as one inch of steel.

(Circle 15 in Readers' Service Dept.)

HYDROTHERM BINDER – Hydrotherm, Inc., has made available to engineers and architects its new spec-

ification and product data binder which has a sturdy, colorful, plastic, hard cover, and is separated into tabbed sections for quick, easy reference. Sections provide complete information on hydrotherm, multi-temp, and packaged boilers, volume hot water heating, installation, accessories, parts, general data and prices. Also included: capacity ranges, dimensions, weights, applications, charts, diagrams, ratings, wiring, and piping instructions, selection tables, service hints, specifications, and other information of prime importance in making the most practical and profitable use of hydronic heating. Designed as a specifying tool, the binder offers finger-tip convenience, provides time and money saving assistance to the busy engineer and architect.

(Circle 16 in Readers' Service Dept.)

FREQUENCY METERS—A 4-page, 3-color descriptive circular, is available free from PRD Electronics, Inc. which features the most complete line of coaxial and waveguide frequency meters available and describes, in detail, the more than 50 different models from which to choose in a variety of ranges covering 0.1 to 40 KMC/SEC. Featured also are many high precision coaxial and waveguide direct frequency meters used for laboratory and production line testing. Calibrated, ruggedized, Mil Spec frequency meters, as well as precision heterodyne and frequency standard multipliers are also described. Charts and photographs indicate frequency, type, accuracy, dimensions, lengths, etc.

(Circle 17 in Readers' Service Dept.)

AIR CONDITIONING—A new, 8-page bulletin describing and illustrating "Selectaflow" dual purpose year round air conditioning control valves has just been issued by the American Standard Controls Division. The folder explains how these self contained thermostatic selector valves, designed for specific application to year-'round air conditioning systems utilizing hot or cold water as a heat transfer medium with a single supply line and a single return line, eliminates the need for pneumatic lines or electrical connections to effect substantial savings in installation cost. Other major advantages and features of these valves holding equal interest to architects, engineers, builders, building owners and occupants are also cited. In addition are specifications on both direct and remote actuator type available and heating cooling cycle operations.

(Circle 18 in Readers' Service Dept.)

STAINLESS STEEL SERVICES—A new, 12-page, illustrated bulletin, "Producing Stainless Steels . . . Exclusively," is now available according to a recent announcement made by G. O. Carlson, Inc. Printed in three colors, this bulletin, to quote directly from its title page, describes how Carlson "provides a specialized service in manufacturing stainless steel plate and related stainless steel products." Within the pages of this new bulletin, Carlson manufacturing procedures are detailed. Typical applications of Carlson materials in metalworking, chemical process, nuclear, aircraft and missile industries, for example, are illustrated and described. A table shows the standard and superior types of stainless steel plate—including the precipitation-hardening grades—that are in Carlson's mill inventory or available on order. Basic production limits in manufacturing stainless steel plates, heads, forgings, rings, circles and flanges, as well as inventory information on bars and sheets (No. 1 Finish), are included.

(Circle 19 in Readers' Service Dept.)

GLASS-CERAMICS—A revised edition of "This Is Glass," a comprehensive story of glass and glass-ceramics, has been published by Corning Glass Works. The 68-page illustrated booklet reviews the history of glass and details the basic types of glass. The publication describes the expanding role of glass in science, industry, electronics, lighting and the home. The booklet includes a section on Corning's new glass-ceramic materials, trademarked Pyroceram, and a two-page chart giving properties of selected glasses and glass-ceramics. A chapter on the contribution of glass to art includes illustrations of several famous Steuben pieces. A preview of the future of glass and glass-ceramics describes the extensive research being done with these basic engineering materials.

(Circle 20 in Readers' Service Dept.)

ENGINEERING AIDS—A new 32-page planning guide by the Hamilton Manufacturing Company effec-

tively portrays equipment advances in the engineering field that are designed to reduce fatigue, increase individual draftsman efficiency and save floor space. Presented is a completely new idea for filing rolled tracing to augment the outstanding filing systems for valuable drawings. With the addition of Moducor Roll Tracing Files complete filing requirements are served by Hamilton-engineered and manufactured equipment. Drafting tables are fully presented in the catalog. Instantly changeable board positions reduce fatigue and increase efficiency. Progressive development has provided facilities for the complete drafting function right at the fingertips of the man at the board to achieve maximum productivity.

(Circle 21 in Readers' Service Dept.)

EXPLODED VIEW—The Mischka Company has published a booklet describing the essentials and advantages of the exploded view method of illustrating instruction manuals and catalogs. Included in the booklet are the methods used in preparation of such illustrations, some of their uses and examples of typical exploded view art work. This method of illustration is commonly used to illustrate commercial as well as military publications, to enhance sales presentations, to assist in training programs and to facilitate plant assembly operations.

(Circle 22 in Readers' Service Dept.)

ELECTRONIC CONTROL—Specific functions, components, and benefits of electronic control centers are described in a new eight-page brochure offered by Barber-Colman Company. Architects, engineers, contractors and users of automatic temperature control systems can obtain information on graphic panel, Selectronic, and indentification control centers for commercial and industrial buildings from this brochure, "Electronic Control Centers." Remote temperature indication, recording and control, point adjustment by electric and electronic instruments are among the functions described. Mention is also made of additional, optional functions, such as control of lighting or interior systems.

(Circle 23 in Readers' Service Dept.)

LIQUID SPRINGS SHOKS—Taylor Devices, Inc. has just published a handbook describing their complete line of standard liquid compressible springs shoks for storing and absorbing from 10 to 1,000,000 pounds of energy and 460,000 foot pounds energy absorption. Also included are springs, dashpots, time delay shoks, pipe systems, actuators and accelerators. The handbook includes fully illustrated and simplified explanations of Taylor liquid compressible devices, design data for "specials," and complete engineering, manufacturing and quality assurance facilities in a modern air conditioned plant.

(Circle 24 in Readers' Service Dept.)

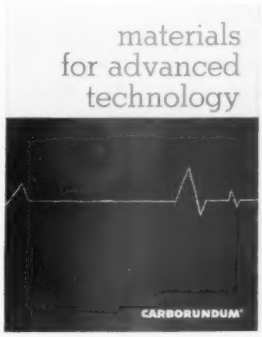
GAGES CATALOG—A new 64-page catalog of replacement parts and spares for its high precision, dial indicator gages and setmaster is now available from Boice Gages, Inc. Large exploded drawings of each gage permit quick reference to part names, part numbers and prices. Facing pages offer precise instructions for disassembly, reassembly and setting of the gages, with each step numbered in sequence. To simplify ordering, contents of the book are classified by category: Boice bore gages, bore gage setmasters, snap gages, groove gages, large diameter gages and large diameter setmasters.

(Circle 25 in Readers' Service Dept.)

PHOTOCOPYING—Six pages describing diffusion transfer photocopying papers and films highlight the current issue of "Photocopy News & Reproduction Review" of Anken Chemical & Film Corporation and its wholly owned subsidiary, Ampto, Inc. The special papers-and-films section describes more than two dozen photocopy papers and films, both negative and positive, and charts many of the special uses for various combinations of these materials. These uses range through a great variety of office copying, printing and art department techniques to a number of engineering drawing reproduction methods. The outside four pages of the new "Photocopy News" include description of a new Ampto photocopier, techniques for copying continous tone photographs, and details on a new photographic contact arc light proofing paper for lithographers, blueprinters, photoengravers and art departments.

(Circle 26 in Readers' Service Dept.)

TECHNOLOGY MATERIALS—Carborundum's pamphlet "Materials for Advanced Technology" is a handy



data packed, 8-page, 2-color roundup on 12 new products from the Company's Research and Development Division. The materials described offer important opportunties for improved design and performance in applications requiring resistance to abrasion, chemicals, corrosion, nuclear radiation, and high temperatures.

(Circle 27 in Readers' Service Dept.)

These listings are informational only and are not an endorsement of the products, nor of the manufacturer's claims. To receive any of the new literature described in these columns, merely circle the item number in the Readers' Service Dept. and mail to AMERICAN ENGINEER.

Missouri Consultant Named to Receive 1961 NSPE Award

Leif J. Sverdrup, P.E., will receive the 1961 National Society of Professional Engineers' Award at the Seattle, Wash., Annual Meeting in July.

Leif J. Sverdrup, P.E.

Sverdrup, president and director of the engineering firm of Sverdrup & Parcel, Inc., is recognized in the citation accompanying the award for "his acumen, sound judgment and ability as an engineer executive; his patriotism, valor and meritorious service to his country as an engineer soldier; his constructive, distinguished and unselfish public service to his fellow man as an engineer citizen; and his talents, competence and leadership as a professional engineer."

Sverdrup's engineering career began with the Minnesota State Highway Department in 1921, where he remained until 1922. He then went to Missouri's State Highway Department, working for that state until 1928, when he became senior partner in Sverdrup & Parcel. When he left the Missouri Highway Department, he had risen to the post of chief bridge engineer.

Bridges built under Sverdrup's direction span the Missouri river at fourteen places, the Mississippi at four. He has done consultant work on several dam construction projects, and through his firm has taken an active part in many other engineering projects.

Sverdrup's military career is as impressive as his engineering career. He served with the Army in World War I from 1918 to 1919. He rose to the rank of Colonel in 1942, was promoted to Brigadier General in 1944 and to Major General in 1945. During World War II, he distinguished himself in combat, receiving, among other medals, the Silver Star, the Distinguished Service Medal, the Purple Heart, the Distinguished Service Cross and the Legion of Merit. His work during World War II was primarily in the Southwest Pacific.

Born in Norway, Sverdrup came to this country in 1914. He received his B.A. from Augsburg College in 1918, and his B.S. in Civil Engineering from the University of Minnesota in 1921. In 1952 he was honored with the degree of Doctor of Engineering (hon.) from the University of Missouri's School of Mines and Metallurgy.

He is a member of National Society of Professional Engineers, American Society of Civil Engineers, American Society of Military Engineers, and is past president of the Engineers' Club of St. Louis, Mo.

Engineers' Week Sales Reach All Time High

Sales of promotional materials for the 1961 National Engineers' Week totaled $11,507.33, an increase of $1,295 over sales for the 1960 observance, according to Warren C. Stadden, national chairman of the event.

Mr. Stadden termed the increase a "good indication of the continued interest in the activities and objectives of the Engineers' Week program."

The total amount expended for the materials furnished by the National Society for the 1961 Week was $13,992.21. The difference between this cost figure and the income received from the sale of promotional materials is made up by an appropriation of the NSPE Board.

The income from sales for the 1961 Week was the highest in the 11-year history of the Engineers' Week observance under NSPE sponsorship.

Purdue Conference Judged Excellent by Delegates

Topics ranging from public relations to building codes provided the agenda for the National Society of Professional Engineers' Annual State Presidents' Conference, held April 14-15, at Purdue University this year.

NSPE state presidents, presidents-elect and executive secretaries and directors listened to and took

MAP Delegates

Michigan SPE President Merle Powers, P.E. (left), and President-elect Richard A. Little, P.E., welcome Executive Director of the Missouri SPE Paul Doll, P.E. (right), to the Michigan Association of the Professions' second annual Congress of the Professions. Michigan SPE was represented at the recent Congress by eight of its top ranking officers.

part in discussions and panel talks covering practically every phase of NSPE operations during the two-day conference, termed "excellent" by those attending.

Representatives from as far north as Alaska and as far south as the Canal Zone were briefed by NSPE's national vice presidents on a wide variety of subject matter, including ethical practices, employment practices, public relations, programs for engineering students and young engineers, chapter activities, financing and registration, legislative matters and governmental contacts.

Highlight of the social side of the two-day meeting was a social hour and banquet held at the Lafayette Country Club. Speaker at the banquet was Prof. Alvin R. Rolfs of the English Department at Purdue. His subject was "A College Professor at Large in Europe." A regional luncheon was held Friday and a general luncheon on the final day of the conference.

The program was opened by NSPE President Noah E. Hull, P.E., who outlined the purposes and objectives of the conference. Paul Robbins, P.E., NSPE executive director, offered delegates a rundown on the Society's administrative procedures and publications.

A complete summary of the proceedings at the Purdue Conference will appear in the June American Engineer.

Professionals Approach Era of Dues' Increases

According to a recent article in the *Wall Street Journal*, members of many trade and professional organizations may be heading into an era of dues' increases.

The American Medical Association has been considering increasing its $25 yearly dues to $35 in 1961 and even to $45 the following year, blaming the need for more funds on $2.5 million headquarters improvement programs and a pension for staff members.

Other groups who will pay more in dues are the American Bar Association who will pay $20 and Sigma Delta Chi, professional journalism society, who will double their long standing $5 in 1961.

Thoughts on Professionalism...

By PAUL H. ROBBINS, P.E.
NSPE Executive Director

What Is Missing?

THE student publication of the engineering school of a large western college recently carried in two successive issues editorials by the editor attacking bitterly the ECPD-developed Canons of Ethics. The editorials attack the objective of the Canons as being "not to protect the public but to restrain competition and suppress self criticism." They question the motivation of the engineers who worked so diligently for a number of years to evolve the Canons and infer that all engineers who subscribe to the Canons are supporting a premise that "a young, hungry engineer must not try to crowd in on an older, already established engineer," and conclude by advising the engineering student to "oppose (or at least ignore)" these Canons of Ethics.

THAT such an attitude should exist on the part of an engineering student (assumed to be an upper classman) at a renowned engineering college is a serious indictment of the educational system and the profession which permits such an attitude to exist. Certainly we would not deny the right of a young man to express his opinion. The serious problem here is that apparently this young man has not been inculcated with some of the basic premises of the profession. It would be interesting to know what exposure this young man may have had in his engineering education to discussions on ethics, to considerations of professional behavior, and to all of the other elements which go into the problem of creating an image of the engineering profession as serving the nation and mankind.

UNFORTUNATELY, the engineering profession has not devoted as extensive consideration as it should have to inculcating professional concepts among students. Happily, there are many signs of change in this attitude. Engineering faculties are more and more discussing procedures and mechanisms whereby they can inculcate in the graduates of their curricula the concepts of professional behavior. The increasing interest in the development of student chapters of NSPE, providing an opportunity for students to meet periodically to discuss professional matters, is an indication of the interest of students themselves in being more deeply concerned in this aspect of professional development.

UNFORTUNATELY, there is a tendency on the part of members of the profession to point an accusing finger at faculty and our educational processes as not accomplishing this objective. It is obvious, of course, that the key to considerations of professional concepts is the attitude of the faculty of the particular institution. Members of the profession, nevertheless, can be of considerable assistance to faculty both in their student contacts and in offering their assistance in student discussions of these problems. Whether these discussions are individual discussions with faculty members, whether they be in the nature of formalized courses, whether they be through student chapters of either professional or technical societies, or whether they be in bull sessions with practicing engineers, the common concept of engineering as a profession carrying with it the responsibilities and prerogatives of professional behavior must continuously be at the forefront of student considerations.

"Bring in one for SIXTY-ONE"

"The whole is equal to the sum of the parts." Thus, the effectiveness and progress of NSPE's programs for the profession increase proportionately with the strength and size of its supporting membership.

New Jersey Students Form NSPE Chapter

Fairleigh Dickinson University in Rutherford, N.J., recently celebrated the formation of a student chapter of the National Society of Professional Engineers as well as the accreditation of its new electrical engineering curriculum by the Engineers Council for Professional Development.

On the occasion Dean Vito L. Salerno of the University's College of Science and Engineering spoke to the Bergen County SPE and the student chapter on the importance of maintaining ethics and standards in the engineering profession.

The Bergen County Society of the New Jersey SPE was instrumental in sponsoring the student chapter at Fairleigh Dickinson.

J. F. Reynolds, P.E.

John Franklin Reynolds, P.E., past national director from Florida, and one-time national vice president of NSPE, passed away recently in Jacksonville, Fla. Reynolds was instrumental in the merging of the Florida SPE and the Florida Engineering Society in 1955, when he was president of both organizations.

Governor Is Urged to Appoint Professionals

David N. Bashaw, Jr., P.E., president of the Massachusetts SPE, recently joined with the presidents of two other engineering organizations in urging the governor of that state to appoint only registered professional engineers to top policy making and administrative positions as far as is practicable.

The resolution submitted to Governor John A. Volpe by Bashaw, Charles H. Norris, president of the Massachusetts Section of ASCE, and Arthur T. Ippan, president of the Boston Society of Civil Engineers, also stated that suitable amendments should be made to existing legislation to require that positions of top technical responsibilities in the state be filled by registered engineers.

A third part of the resolution stated that the professional engineering societies would be pleased to assist such a move by submitting lists of PE's who could qualify for particular positions.

Missouri SPE President Given Honorary Degree

Melford E. Monsees, P.E., of Leawood, Kansas, president of the Missouri SPE, recently received the honorary degree of Knight of St. Patrick from the University of Missouri for his work in the furtherance of the engineering profession in Missouri.

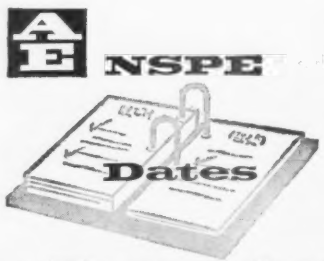
Monsees is chief of the Engineering Service Branch, U.S. Army Corps of Engineers in Kansas City, and has been active in recruitment of young men into the profession. His latest published article is a chapter on "Professional Development" in the new *Optimum Utilization of Engineers*, published by the American Management Association.

Pierce Gets Citation From Corps of Engineers

Harvey F. Pierce, P.E., recently was awarded a citation by the U.S. Army Corps of Engineers for his vital work in the complex missile facilities at Cape Canaveral and Patrick Air Force Base.

Engineering manager and secretary-treasurer of Maurice H. Connell & Associates, Pierce received the award at a recent meeting of the Miami Chapter of the Florida SPE. He is a 1961-62 NSPE vice presidential nominee.

Saluting his significant contributions in the interest of national defense, the citation stated, "Through his outstanding individual technical ability, resourcefulness and imagination, together with his excellent organizing and administrative ability, the design of the crash missile facilities met all required schedules." Representative of the launchings made from the two bases are Thor, Vanguard, Polaris, Pershing and the Saturn programs.



to Remember

South Dakota Society—Annual Meeting, May 6, Sioux Falls, South Dakota.

New Jersey Society—Annual Meeting, May 5-6, Ambassador Hotel, Atlantic City, New Jersey.

Vermont Society—Annual Meeting, May 13, Montpelier Tavern, Montpelier, Vermont.

Pennsylvania Society—Annual Meeting, May 18-20, Pittsburgh, Pennsylvania.

Maryland Society—Annual Meeting, May 19-20, Carvel Hall, Annapolis, Maryland.

Montana Society—Annual Meeting, May 20, Rainbow Hotel, Great Falls, Montana.

Connecticut Society—Annual Meeting, May 20, Hotel Taft, New Haven, Connecticut.

Michigan Society—Annual Meeting, May 25-27, Rackham Memorial Building, University of Michigan, Ann Arbor, Michigan.

California Society—Annual Meeting, May 26-27, Casa Munras Hotel, Monterey, California.

Alabama Society—Annual Meeting, May 27, Whitley Hotel, Montgomery, Alabama.

New York Society—Annual Meeting, June 1-3, Sha-wan-ga Lodge, High View, New York.

Delaware Society—Annual Meeting, June 8, Wilmington, Delaware.

Georgia Society—Annual Meeting, June 15-18, Wilmington Island Hotel, Savannah, Georgia.

South Carolina Society—Annual Meeting, June 15-17, Francis Marion Hotel, Charleston, South Carolina.

Indiana Society—Annual Meeting, June 16-17, French Lick-Sheraton Hotel, French Lick, Indiana.

Nevada Society—Annual Meeting, June 17-18, Las Vegas, Nevada.

Utah Society—Annual Meeting, June 18, Salt Lake City, Utah.

Missouri Society—Annual Meeting, June 23-24, Governor Hotel, Jefferson City, Missouri.

Hawaii Society—Annual Meeting, June 24, Honolulu, Hawaii.

National Society of Professional Engineers—Annual Meeting, July 4-7, Olympic Hotel, Seattle, Washington.

National Society of Professional Engineers—Fall Meeting, October 19-21, Hotel Roanoke, Roanoke, Virginia.

NSPE news briefs

• At its state convention in Knoxville, the **Tennessee Society** recently elected the following officers for 1961-62: Dwight J. Goodman, P.E., Winchester, Tenn., president; Edward M. Dougherty, P.E., Nashville, first vice president; Warner Howe, P.E., Memphis, second vice president; David A. Roberson, P.E., Tallahoma, secretary; and Karl Stallings, P.E., Nashville, treasurer.

• In celebration of his thirtieth year on the staff of the University of Minnesota Mechanical Engineering Department, **Professor James J. Ryan,** P.E., will hold a reception on May 22, in the Grand Ballroom of Coffman Memorial Union on the campus. He has extended an invitation to all friends and associates. At that time he will exhibit in his research laboratory instruments he has invented as well as his automotive crash safety equipment.

• **L. L. Dresser,** P.E., **past president of NSPE**, 1951-52, has been nominated by Tulsa, Oklahoma's Mayor James Maxwell to fill a vacancy on the Tulsa Airport Authority. Dresser's long time interest in aviation stems from 1929 when he accepted a set of flying lessons as part of the fee for some engineering work he performed. He established his own engineering firm in 1926 and has been active in Tulsa since that time.

• **NSPE Vice President Benjamin Elliott,** P.E., Madison, Wisconsin, recently represented the Society at the inauguration of Owen Meredith Wilson as the ninth president of the University of Minnesota in Minneapolis.

• **Frank L. Martin,** P.E., past NSPE national director from the District of Columbia, retired recently from active service with the Federal Government Maritime Commission and Maritime Administration. He had been with the Commission for 26 years, most recently as supervising naval architect and branch chief in the Office of Ship Construction.

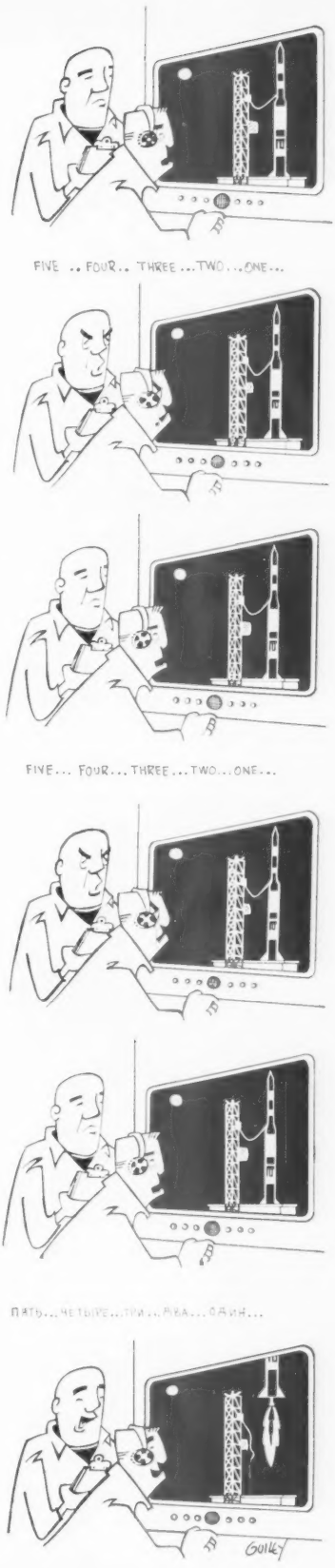
• **Bill M. Ferguson,** P.E., secretary-treasurer of the **Shreveport Section** of the **Louisiana Engineering Society,** was a panel member on the Louisiana Community Development Seminar recently. The event was sponsored by the State Junior Chamber of Commerce in Monroe, La. Also participating in the event was Tom Ruffin, P.E., president of the Shreveport Section who is also a past national vice president of the Jaycees.

• Keynote speaker at the annual meeting of the **Texas SPE** in Abilene, Texas, recently was NSPE President Noah E. Hull, P.E., also a native son and member of the TSPE San Jacinto Chapter. Hull was introduced at the meeting by another Southwesterner, NSPE Vice President Thomas Mann, P.E., Roswell, New Mexico.

• The **Nassau County Chapter** of the **New York State SPE** recently installed the following men as officers for 1961: Henry J. Campbell, P.E., president; Clyde M. Alston, P.E., first vice president; Henry R. Gordon, P.E., second vice president; Leonard Spiegel, P.E., secretary; Joseph Stein, P.E., financial secretary; and Donald Bass, P.E., treasurer. Also installed at the same meeting were new directors Joseph E. Dobson, P.E., John S. Parnon, P.E., and David Arella, P.E., who will serve for the period 1961-64.

• The **Mississippi SPE** recently honored Mrs. H. A. Kroeze and Baxter Wilson, president of the Mississippi Power & Light Company, with plaques. Mrs. Kroeze's late husband was honored as the "Engineer of Former Years" and Wilson was named "Engineer of the Year."

• Newly elected 1961 officers of the **Northwest Suburban Chapter** of the **Illinois SPE** are: Kenneth G. Cook, P.E., Des Plaines, president; Carl H. Bowen, P.E., Arlington Heights, vice president; Albino Angonese, P.E., Mt. Prospect, secretary; and Charles R. Hays, P.E., Park Ridge, treasurer.



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New officers of the Tennessee Society of Professional Engineers, Dwight J. Goodman of Winchester (left), president, and David A. Roberson of Tullahoma (center), secretary, go over a documentation of engineers' roles at the Arnold Engineering Development Center with R. M. Williams, managing director of ARO, Inc., at Arnold Air Force Station, Tenn.

By Mrs. Clark A. Dunn, Chairman, Ladies Auxiliary Advisory Committee.

The response to the questionnaires sent to all of the auxiliaries in March is very gratifying. They show increased interest and growth in the auxiliary movement. Many new auxiliaries have been formed during the year. Some not previously mentioned are Broom Area Chapter, New York State Society of Professional Engineers with Mrs. Ernest J. Pilotti of Binghamton, N. Y., as president, and the Woman's Auxiliary to the Yakima Chapter of Washington, with Mrs. W. W. Farrell as president.

Another interesting report on Engineers' Week activities comes from one of our newest auxiliaries, the Stanislaus Co., California, Chapter Auxiliary. The ladies assisted the parent chapter by decorating the tables at a banquet at which engineering students at Modesto Junior College and high school students interested in engineering careers were guests. They also arranged a display on the career theme in a bank window.

Plans are being made for a spring dance by the Topeka Auxiliary to the Kansas SPE. Their auxiliary has been very active this year with every monthly meeting an outstanding one.

The Tulsa, Oklahoma, Auxiliary reports a successful benefit bridge and canasta luncheon to raise money for the scholarship which they give annually to a junior or senior engineering student at Tulsa University. There were 284 ladies present and they cleared almost $200.

Congratulations to the new chairman of the Texas State Advisory Committee. She is Mrs. John H. Southwell of the Sabine Chap-

Tennessee Officers

ter. Her address is 3260 Minglewood Drive, Beaumont, Texas.

Fun! Fun! Fun! was the keynote of the auxiliary participation in the annual convention of the Texas Society of Professional Engineers held in Abilene in February. Entertainment included a tea in the home of a member, a brunch and fashion show at the Abilene Woman's Club, and a Luau, Texas-style, at which the ladies joined their husbands in an evening of fun in gay Hawaiian costumes.

All was not play, however. The ladies met for their annual state business meeting with Mrs. L. J. Roberts, state chairman, presiding. The group voted to continue their activities as they had been, that is, with a state advisory committee instead of a state auxiliary. The newly organized Auxiliary to the Gulf Coast Chapter was welcomed.

The State of Ohio has established a state auxiliary advisory committee. Mrs. Homer Borton of Cleveland was elected chairman. Ohio auxiliaries are to be congratulated on this step.

The April meeting of the Riverside-San Bernardino Auxiliary sounds very interesting and worthwhile. Mr. Wm. Flye spoke on *Elements of Traffic Engineering* which is certainly a timely topic.

Coleman L. Hasie, P.E.

Coleman L. Hasie, P.E., longtime engineer of Lubbock, Texas, died recently at the age of 64. A partner in the consulting firm of Hasie & Green and Assoc., he has been active in Lubbock since 1925 as a Mason, a Shriner, and a member of the Texas SPE. Among the survivors was his son, Montague, who will replace him in the firm.

CUBA

(Continued from page 39)

tors so that they may pass the state medical board examinations. A junior college in the Miami area is working on a smaller scale to provide the same opportunity for engineers. Still much work remains to be done if all of the available refugee skills are to be put to good use.

Doing more of the remaining work will involve a number of people and organizations. One of the most experienced organizations in this field is the American Council for Emigres in the Professions (ACEP). Working from New York, ACEP has already begun to handle a number of the Cuban refugees, including more than a few engineers. The type of work done successfully by this organization in the past may indicate what can be done to aid the Cubans.

Facing the same problem with lawyers used to continental law in the past, ACEP realized that retraining would probably be too much trouble if the lawyers wanted to stay in law. But, ACEP realized that they might be able to handle another type of work effectively and began shopping around. They then discovered that this country has a drastic shortage of trained librarians. Because of the background the lawyers had, they were able to train as librarians in a relatively short time. In other areas, ACEP found that a reasonable amount of study frequently fitted various professional people to be teachers, and many have been given the opportunity to do this.

But perhaps the next step in handling the professional refugees from Cuba is the most vital—finding work for them, placing them in positions where they can work to their full capacities, support themselves, and contribute to society in proportion to their skills.

If the American engineer wishes to do something really valuable for his Cuban colleagues, he can by helping to return Cuba to democracy. This is what Cubans want most, and there are ways in which the American engineers can help. The important thing is to be willing to do it and to be ready to overcome all the obstacles and disappointments they will encounter in their way.

The Cuban refugee problem is one that is on its way to solution, but to push it all the way to that solution, more work is needed. Furthermore, when the solution is gained, it is a safe bet that the nation will be richer in skilled manpower, and perhaps most important, richer in reputation and in friends among those whom it has helped.—**End.**

MANN

(Continued from page 40)

media through which we can consider and better our own particular branch of engineering, namely a functional section. The Functional Section Services Committee is charged with the duty of assisting you in the formation and operation of a group under the framework of NSPE for your specific branch of engineering. The Committee has compiled the basic information and requirements for you to form and operate a functional section to meet your wishes and needs. The Committee also serves as a clearing house for information between functional section meetings. If you feel that your needs can be better served through a specific group, then form that functional section.

NSPE would not be in existence very long if the local chapters failed to function. The Chapter Activities Committee has the responsibility of assisting the chapters in whatever way possible. This Committee has compiled and distributed one of the most complete guides and reference media ever to come out of your organization, the *Chapter Handbook*, "the blue book." It is an owner's guide, part catalog and operation manual all in one. If the information you want is not in the blue book, there are complete detailed instructions of how you can obtain it. Although the Handbook is brought up to date every year, the old book can be used for years to come. The basic requirements for the production of your product will hold good as it was originally conceived. The cost is modest and within the means of all of us, and the benefits derived therefrom are unlimited. The beautiful part of this book is that you, as a chapter officer or member, do not have to expose your lack of knowledge. Just read your *Chapter Handbook* and be one of the better informed.

NSPE has only one way to continue to safeguard and improve the health, safety and welfare of the public—through you, the membership. Membership is the structural stability upon which your organization depends for its very existence. The Membership Com-

mittee is charged with many and varied responsibilities, but their primary responsibility is service to you, the owner. The operational personnel of this organization is obtained only from the rosters of your chapters. Membership recruitment is your job and obligation. How you do it is immaterial, just as long as you do it. The Membership Committee can only goad, guide and assist you. Never lose sight of the members you now have: keep them active. The turnover in the management of this organization of ours is high. Review your potentials continually, as only you know who is worthy of membership.

Throughout this article I have referred to the product of NSPE. That product is professionalism, a high standard expression of you, the individual engineer. The Organizational Functions Group is here to serve you, the professional engineer. If you do not use the facilities at your disposal our product, professionalism, will decline and be replaced by some other commodity with which we as Americans cannot live.—**End.**

CHRISTIAN

(Continued from page 41)

priority basis, which programs, if any, rate preferential consideration. This is never a simple chore.

The Constitution and Bylaws Committee: This committee seldom initiates amendments to the Constitution or the Bylaws. Rather, it receives recommendations and instructions from the Board of Directors. These are usually the result of deliberations of one or more of the many other committees. As proof of the dynamic character of the Society, a meeting of the Board of Directors seldom passes without some report from this committee.

The Nominating Committee: While this committee is included in this group, it is one apart from the others in several particulars. It is not appointed by the president. Its functions and duties are clearly and thoroughly defined in the Constitution and Bylaws. This committee performs its assignment entirely free of the supervision of any officer of the Society. It is the only committee elected by the Board of Directors. It is also probably the only committee made up entirely of new members each year, devoid of the continuity found in others. The exceptionally successful performance annually is indicated by the uniformly high qualifications of the Society's officers, their complete dedication to the Society and their devotion to ever growing responsibilities. (Modesty, of course, requires the Author to except himself from this last observation, hopeful that this will not detract from its sincerity.)

The Organization and Functions Committee: This is a relatively new committee which maintains a continuing study of the entire organization of the Society. Many of these studies are originated by recommendation of the Board of Directors as a result of committee suggestions. Here again is a demonstration of the fact that your Society is young, dynamic, for this committee is never lacking in a wide variety of subjects involving problems of organization and functions.

The Policy Review Committee: The need for this committee became quite apparent a few short years ago, after the compilation and publication of "Administrative Policies and Professional Policies of the Society." These compilations included all significant policies adopted over the years by the Board of Directors. Since these policies must be modified, amended and amplified almost continuously, it becomes necessary for this committee to sit annually to update the Society's policies. This is largely an editorial effort intended to interpret and incorporate newly adopted decisions of the Board of Directors during the previous year, involving new policies as well as amendments to these previously adopted. One other function of this committee is to examine all policies and recommend restudy of some by appropriate committees when changing times and conditions make such studies advisable.

The Resolutions Committee: This committee performs the functions which similar committees do in most organizations, perhaps routine but necessary. It receives resolutions from all sources and segments of the Society. If a resolution relates to an existing policy, or if it is related to the activities of some other committee, it is automatically referred to such committee for study and recommendation. Thus, most resolutions receive much attention before presentation to the Board of Directors for action. The resolution form is frequently used by member state societies as a medium for bringing to the attention of the Board of NSPE, the local society's beliefs and wishes. Such philosophies thus receive an airing nationally.

Assignments to the committees in this group may be more work-a-day than glamorous. Nevertheless, each is an essential element of the Society and each does perform a role in the "coordination of policy development."

Committee activities constitute a major factor in the Society, within each segment, chapter, state, national, as well as functional sections. So much can be accomplished through this medium. It provides a means for participation upon the part of a large percentage of the membership.

Each participant, through these activities, acquires a more thorough understanding of the aims, objectives and reasons for the existence of this great, altruistic organization of ours.—**End.**

WORLD BANK

(Continued from page 33)

in question. Fortunately, there is a way of determining this. From time to time, the Bank surveys its member nations to find out their economic conditions, what may be needed in terms of resource development, and in general which of the projects would constitute good risks for Bank funds. Experience has shown that these surveys are often accurate sign posts pointing to future projects for Bank financing. These surveys are published by Johns Hopkins University and are available to the public. While they are not a sure thing, they are still a reliable indication of business that is likely to be available, and they definitely are a help in narrowing the field.

IT is not easy to arrange a Bank-funded project. Like any other

major source of engineering work, the Bank attracts tough competition. Further, according to a World Bank engineer, "Many of the projects we finance are on a large scale, but even projects on a much smaller scale present unusual problems for many of the Bank's borrowers. They are problems of planning, organization and execution and they are made difficult because the underdeveloped countries as yet have only a little experience in tackling development schemes. For the Bank, the result is that we feel it is necessary to take even more than ordinary banker's care in considering and investigating loan proposals. We do our best to see that projects are selected that will contribute most to strengthen the economy of the borrowing country."

This means, understandably, that those engineering firms who have had experience in large scale, overseas development projects are likely to have an advantage. In other words, as is true in so many other areas, those firms that are big will tend to get bigger. It creates, in one engineer's words, "a tough market for a new firm."

Further, it is not unusual to find an American firm working at something of a disadvantage in trying to find a Bank-financed project. The reason for this is in many cases more real than logical. There is a tendency, say industry engineers, for a newly developing nation—India is a good example—to favor its own engineers over outsiders. All other things being equal, this could be the difference in the nation's selection. The motivation for this is, of course, nationalism, and to that extent is understandable. But it is one more factor the engineer must consider before seeking this type of work.

With all of these drawbacks, then, why is it worth it for an American engineering firm even to consider Bank projects? The answer seems to be that the advantages outweigh the difficulties. For one thing, Bank projects tend to be large scale which means they provide proportionately large returns. Secondly, they can provide experience to the engineering firm that might not be obtainable elsewhere. And perhaps most important, any

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engineering project that has been approved by the Bank, after its extensive screening and rigorous qualifications, is not likely to fold. Precisely those factors which make Bank work so difficult to obtain, work directly in favor of the engineering firm that gets a job.

The competition is tough; the requirements are exacting, and the work is hard to get. But for the engineering firm looking for a broad new field of operation, if it feels able to meet the standards required, the World Bank offers a major source of engineering work that should not be overlooked under any circumstances.—**End.**

VAN DORN

(Continued from page 28)

our whole country over past decades leaves no doubt of this.

There is a tendency today, however, to forget the greatness of our country and belittle its achievements by comparison with Soviet flashes of genius. Bryce N. Harlow, deputy assistant to former President Eisenhower, speaking before the Southwest Electric Conference in Chandler, Arizona, recently threw some light on this subject. Describing what we would have to do to put our economy on a par with that of the Soviets, he said:

"We would first have to abandon three-fifths of our steel capacity and two-thirds of our petroleum capacity. We would destroy two out of every three of our hydroelectric plants and use only one-tenth of our present volume of natural gas. We would then rip up 14 of every 15 miles of our paved highways and two of every three miles of mainline railroad tracks. We would scuttle eight of every nine ocean-going vessels and scrap 19 of every 20 cars and trucks. We would discard nine of every ten telephones and seven of every ten houses. Then we would put about 60 million people back on the farm."

While our international rivals are spending a good part of their time trying to match that economy, let us set our sights ahead so that ten and twenty years from now we can point with pride to comparable achievements in new fields of endeavor.—**End.**

BER CASE

(Continued from page 31)

would be in a better position to recommend a number of competent consulting concerns in the sanitary field than any of the engineering societies. The manner in which these recommendations are presented, in our opinion, become all-important and determine whether there can be any conflict of interest at a later date.

In connection with question 2 we would think that a list should cover primary firms which he knows personally are qualified, but we see no objection to including firms which he does not know personally but from reliable sources has a good reputation in the fields required for this consulting work. Undoubtedly, the state office and other sanitary engineers associated with that office will have information on qualified concerns with which he may not be personally acquainted.

Additional reports by the Board of Ethical Review will be carried in June and succeeding issues of the AMERICAN ENGINEER.

With reference to the 3rd question, the responsibility of the state sanitary engineer in passing on plans submitted by firms which he has listed as qualified would obviously be exactly the same as his responsibility in connection with firms which were not on his list. This statement of responsibility should be made clear in any conversation or letter to the community at the outset.

We have no objections to the sanitary engineer suggesting to the community officials that they obtain recommendations from a qualified engineering society and in some cases this might be more prudent. The fact remains, however, that this situation is more cumbersome and the society will undoubtedly be influenced by the sanitary engineers of that society if for no other reason than the fact that they have the greatest knowledge in this field.

Frankly, if we were officials of a community and required the services of a qualified sanitary engineering firm, we would expect that

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we could get dependable information from representatives of the state who are continuously concerned with this sort of work. We would expect this as a service from the state and we would recognize that obtaining this information would in no way affect or change their responsibility to us or the public in connection with detailed review of any plans they might be submitting.

Board of Ethical Review
PHIL T. ELLIOTT, P. E.
MARVIN C. NICHOLS, P. E.

TAU BETA PI

(Continued from page 24)

knowledge one must acquire to be an engineer. This means that the student engineer has to be exposed to more basic concepts than previously to be abreast of present day technology. However this technological development should not suppress the student's liberal education. Therefore, to attain the level of knowledge necessary in this age education beyond the bachelor of science degree is necessary. I also believe that the individual should specialize more because technology is too vast.

"I don't think that engineering has suffered from emphasis on science in connection with such events as satellite launchings. I feel that engineering is becoming more and more allied with science in that engineers are doing research and work that scientists did. I don't think there should be a distinction between engineers and scientists because they are striving for the same goal.

"Concerning the question of whether the undergraduate curriculum offers a broad enough base in science, I feel I would have desired a broader base in the physical sciences because I am interested in semi-conductor research. However, this is a personal desire and the undergraduate curriculum must be designed to present the most important concepts of engineeering and science which will be of benefit to all the students. There is a limit as to how much can be sandwiched into a four-year curriculum. This dilemma necessitates educa-

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tion beyond the four-year engineering curriculum as stated before."

ALAN J. DEVILBISS
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"An early interest in physical science and electronics, what appeared to be a reasonable aptitude in mathematics and science, coupled with the help and encouragement of my high school math and science teacher (Mr. Norris Lambert, Roanoke High School, Roanoke, Louisiana) were the major reasons I chose to study engineering.

"My love for engineering work has continued to grow with my association with work of this type, but my goals have changed somewhat in the last few years. Specifically, I hope to extend my formal education to a higher level and as a consequence, work at a higher level of engineering research than I had originally planned.

"Acceleration of the advance of technology means more and better jobs and more rapid advancement, on the average, for everyone; but, in general, engineers benefit most from this standpoint. The task of advancing our technology was given increased seriousness and necessity by events of the last few years – most notably Sputnik and other Russian achievements – and better technology will require more and better engineers. The space technologies have undoubtedly received more emphasis in this country as a result of Russian success in this field, and since I plan to work in a field intimately connected with the space technologies, I expect this will mean both a better job and more rapid advancement for me after graduation.

"Since Sputnik, I feel that engineers in general view their jobs

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somewhat more seriously than before. Again the most pronounced effect is in the space technologies, but I believe that all engineers have experienced new motivation to do their jobs well. Engineering professionalism and a serious approach to engineering usually occur simultaneously and could be considered synonomous. I believe both are increasing.

"Do I feel that there is a need for a higher level of education for the individual engineer as a result of increasing technology? Yes. We need more engineers. But in advancing technology even more pressing is the need for *better* engineers. A high level of education, while it is not an entirely sufficient condition, is usually a necessary one in obtaining better engineers.

"It is becoming increasingly more difficult to distinguish between scientists and engineers. Most of our studies are in the same fields, often in the same courses. Some of my colleagues doing graduate work in engineering are the products of an undergraduate 'science' curriculum. Often the primary difference in the careers of a scientist and an engineer is in the name. With fates as intermingled as are those of science and engineering, I do not believe that one could suffer from emphasis on the other."—**End**

LETTERS

(Continued from page 4)

the Future?" starts with a quote from the *New York Times*, which you say "is generally considered reliable." I am enclosing some clippings of pages 18, 19, 46, 47 & 48 from the *American Legion* magazine for March, 1961, which will give you another man's opinion on that reliability.

I am happy that your staff expressed the doubts about the information given, but after all, the complete propaganda story was presented, and the damnable Communist regime was given credit for such progress as has been made. There is no doubt about the tremendous potential of the Chinese people, and any progress is not because of the Communist regime, but in spite of it.

Please! let's not further the cause of the Communists by repeating their fantastic claims. If you can get the facts, and give us truthful objective reporting, we will welcome them, even if they prove us wrong in our estimate.

WALTER R. PICKERING, P.E.
Joplin, Mo.

► ***Editor's Note:*** **It is believed that the staff writer of the article in question did an adequate job of presenting an objective picture of engineering in Red China today. True, there is much in this study that is difficult for Americans to accept but ignoring the existence of this "giant" is, we feel, to invite a complacency which could lead to disaster not only for the profession but also for our country. Indeed, foreign competition even now is of grave concern to American industry and that means American *engineering*.**

On the point of *New York Times'* reliability, several recent surveys are interesting. In 1960 when 311 leading U. S. newspaper *publishers* were asked to select the top ten newspapers in the country, 91.31 per cent named the *Times* to first place. (*Editor & Publisher* magazine, April 8, 1960.) Also last year, 335 newspaper *editors* were asked by *Practical English* magazine to rate newspapers in the U. S. "most superior for news coverage, integrity and public service" and again the *Times* attained the lead. (E & P, April 2, 1960.)

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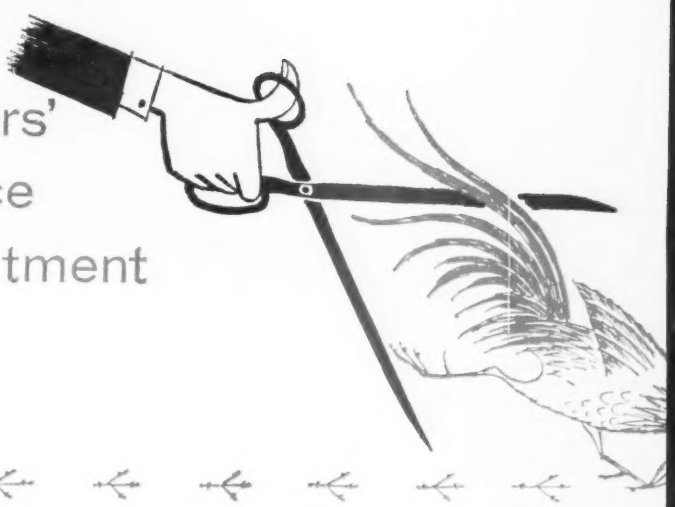

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Now it is easier than ever for you to get information f-a-s-t on new products and services. The other side of this page when folded makes a *self-addressed reply envelope* that is all ready to come back to us. All you have to do to use it is to first read the advertisements, and the "Progress in Products" and "New Literature" features in every issue, noting that each makes specific reference to numbers on the form below.

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May, 1961

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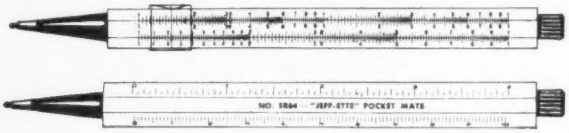
Progress in Products

SLIDE RULE PENCIL — Item 30

Alvin & Company Inc. introduces the "Jeff-Ette" combination slide rule and mechanical drawing pencil. Slide rule has A, B, C, and D scales on face. Sides of the rule incorporate a 1" drawing scale divided into 32nds and a millimeter rule up to 10 centimeters. Performs multiplications, divisions, squares and square roots. Small cursor unit has spring tension and fine hairline.



HEATROL SYSTEM — Item 31

Electrical resistance heaters of Nottingham, "Heatrol" building-block system for preheat, postheat, and stress relief safely, economically attain metal temperature of 1400 and higher. Standard plug-in units include 12", 18" and 36" strip heaters (upper), pipe heaters for diameters down to 3", automatic time-temperature controls, and neoprenemolded distribution equipment.

FLUORESCENT BALLAST — Item 32

Advance Transformer Co. offers an innovation in fluorescent lamp ballast design which incorporates *unitized ballast construction* . . . ballast housing, core and coil, capacitor and the new Advance "SOLID-FIL" development combine to offer drip-free unitized construction. The basis of the improved "SOLID-FIL" material is polyester which differs from ordinary solid fill materials in that it retains a pliable consistency and will not become brittle with age or heat, permitting retention of its excellent thermal and sound deadening characteristics. Accelerated heat tests proved deterioration or drippage of the Advance "SOLID-FIL" developments.

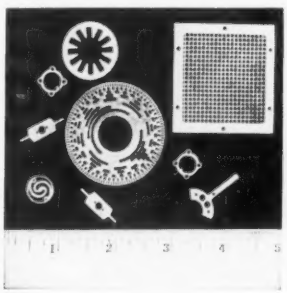
TEMPERATURE SENSORS — Item 33

ARi has developed a complete line thermocouple type temperature sensors for use up to 4000°F. These are of noncooled and cooled types to measure liquid, solid and gaseous temperatures. Some of the sensors are usable in oxidizing atmosphere up to 4000°F. and intermittently higher. These probes are designed for such applications as measuring the temperature of exhaust gas in an afterburner, molten glass, fuel pins of a nuclear reactor, missile nose cone, combustion processes, flue gas "checkers," crystal growing ovens and many others.

IRON GRATING — Item 34

A new application of tough, corrosion resistant ductile iron as coverings and gratings for streets and highways has been developed by Consolidated Edison Company employing easy-to-cast metal as grating over transformer vaults. Gratings have corrosion resistance of cast iron, strength of steel and configuration to assure consistent fit. Ductile iron bridges the gap between cast iron and steel, combines the low cost, and process advantages of cast iron with strength of steel.

SUB-MINIATURE PARTS — Item 35



Custom made precision parts with tolerance as close as .0002, through chemical etching are being produced by Komak, Inc. No deburring is necessary on the precision parts which can be furnished in Hy-Mu 80 and Hy-Mu 800, stainless, beryllium, copper, phosphor bronze, silicon, nickel silver and silver as well as copper, brass, bronze, spring steels, nickel alloys, and others. Parts are used by makers of watches, computers and in defense industries.

STABILIZING BASE — Item 36

The R. S. Krage Company has found a new and faster way of laying stabilizing base. On one project using two Maginiss Powr-Pactors instead of one hooked together with a common rigid shaft they compacted the stabilizing base to 101 per cent modified proctor density. The Powr-Pactor traveled 50 ft., delivered 7,000 2-ton blows per minute and required one operator. This dual Powr-Pactor operation replaced a vibrating roller that had been previously pulled by a crawler tractor.

STENCILS — Item 37

Standpat has developed a series of tracings and stencils designed to save time with noncreative drafting of specification boxes, title blocks, symbols, standard components and subassemblies, etc. With their extra fine matte surface, they can be applied to the front side of tracings and draftsmen can letter directly on them. Helpful when drawings must be microfilmed. Printed on sheets of matte surfaced acetate-backed with a heat resistant adhesive. No special equipment required.

This feature describes new products of general interest to professional engineers. For further information, circle the item number in the Readers' Service Dept. and mail to AMERICAN ENGINEER.

These listings are informational and are not an endorsement of the products, nor of the manufacturer's claims.

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Now offered in regular transcontinental passenger service, American Airlines' new 707 Astrojet brings you a new standard of jet performance by the airline that's *first choice of experienced travelers.*

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